



Spring 2017

# Winthrop University Undergraduate Scholarship & Creative Activity 2017

Winthrop University

Undergraduate Research Office

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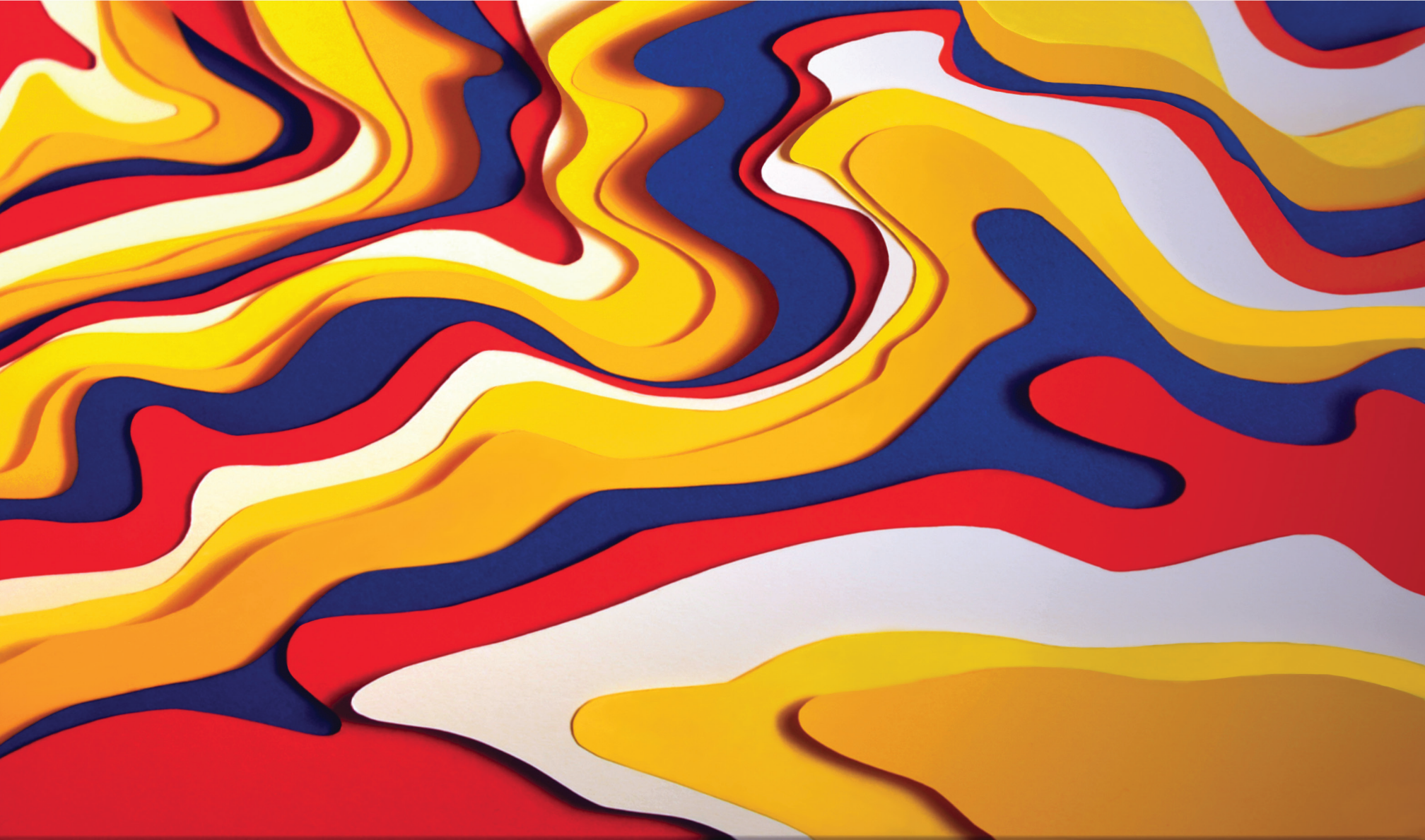
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WINTHROP UNIVERSITY  
**UNDERGRADUATE SCHOLARSHIP**  
**& CREATIVE ACTIVITY 2017**

**“Creativity requires input, and that’s what research is. You’re gathering material with which to build.”** – Gene Luen Yang, American cartoonist

**“There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after.”** – J.R.R. Tolkien

University College and Winthrop University proudly present *Undergraduate Scholarship and Creative Activity 2017*. This sixth annual University-wide compilation of undergraduate work chronicles the accomplishments of students and faculty mentors from 29 academic departments and programs, spanning all five colleges of the university: College of Arts and Sciences (CAS), College of Business Administration (CBA), College of Education (COE), College of Visual and Performing Arts (CVPA) and University College (UC).

We think you will be impressed by the depth and diversity of the scholarly and creative research highlighted within these pages. As you will see, these student projects grew from a variety of origins, including curricular requirements and extra-curricular programs, and were supported by a range of intra- and extramural funding sources. Students also shared their projects in a remarkable array of venues: publishing papers in refereed journals; presenting and performing scholarship at regional, national, and international conferences; and showing work in juried exhibitions. We congratulate all our student scholars on their creation of new knowledge and new forms of creative expression, as well as their development of professional skills and attributes that have prepared them to pursue nationally competitive awards, graduate and professional degrees, and employment in their chosen fields. In particular, we acknowledge undergraduate Ashley Cook, a visual communication design major who completed the entire design and layout of this book.

We also recognize the faculty members who served as mentors, coordinators, thesis readers, and reference writers, whose commitment and dedication enabled students’ accomplishments. We thank them for helping to sustain a vibrant learning environment on campus and for contributing to the development of the next generation of curious, engaged professionals. Lastly, we thank Marley Wade, graduate assistant in the Undergraduate Research Office, for invaluable editorial help.

We hope you enjoy our compilation! Please note that much of the work described here will be presented, performed, or displayed during the Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE) on April 21, 2017. We hope you will join us!

**Robin K. Lammi, Ph.D.**

Director of Undergraduate Research

**Gloria G. Jones, Ph.D.**

Dean of University College

*Undergraduate Scholarship and Creative Activity 2017* highlights many landmarks achieved by Winthrop students. For the cover design, I chose to artistically represent the topography of the campus in a series of layers that shows the many overlapping perspectives and interests of the collective body here at Winthrop University.

**Ashley Cook**



# TABLE OF CONTENTS

Winthrop University Undergraduate Research Initiative	5
Publications	7
Honors Theses	8
Public Presentations and Performances	21
29th Annual Undergraduate Juried Exhibition	57
Department of Fine Arts Senior Exhibitions	60
Department of Design Senior Exhibitions	64
Department Of Music Undergraduate Recitals	66
Department Of Theatre and Dance Festivals and Showcases	67
Additional Projects	70
Eagle STEM Scholars	79
McNair Scholars	80
Office Of Nationally Competitive Awards (ONCA)	82
Winthrop Initiative For STEM Educators (WISE) Scholars And Interns	85
Student Index	86
Faculty and Staff Index	89



# WINTHROP UNIVERSITY

## UNDERGRADUATE RESEARCH INITIATIVE

The Winthrop University Undergraduate Research Initiative supports a student-centered learning environment that fosters student research, scholarship, and creative activities. The Initiative encourages students and faculty mentors to collaborate in the design and implementation of projects and the dissemination of results.

### **University-Wide Undergraduate Research Advisory Committee:**

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Stephen Smith, Ph.D., Political Science  
Bradley Tripp, Ph.D., Sociology and Anthropology  
Scott Werts, Ph.D., Environmental Sciences and Studies  
Kristi Westover, Ph.D., Biology



# PUBLICATIONS

## Sport Management Majors' Perceived Motivators and Barriers to Participation in a College-sponsored International Experience

*Sport Management Education Journal, 2017, Under review.*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Emily Almond**

Honors Thesis Committee: Seth Jenny, Ph.D.; Jinwook Chung, Ph.D.; and Scot Rademaker, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

The purpose of this study was to determine the perceived motivators and barriers of sport management majors to participate in a college-sponsored study-abroad experience. An online survey was administered to 180 undergraduate and graduate sport management students from across the United States. Results indicated that the top motivators were: 1) overall life experience, 2) the opportunity to live in another country or culture, and 3) resume building, while the top barriers were: 1) finances, 2) missing social time and events on campus, and 3) lack of knowledge about opportunities – relatively consistent with both open-response and rank-order question types. Not highlighted in previous research, open-response questions revealed that “meeting new people and having fun” (6.7%) and “uncomfortable being away from home” (19.4%) were mentioned as a top motivator and barrier, respectively. Most notably, only five (2.8%) of the sport management sample students had previously studied abroad. Implications of these findings will be discussed, focusing on recommendations to increase participation in college-sponsored international experiences for sport management students.

## Caucasian and African-American Adults' Perceptions of Police in St. Croix and the U.S. Mainland

*Journal of Psychological Inquiry, 2017, In press.*

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; TRiO McNair Research Symposium, Columbia, South Carolina, June 2016; Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2017*

**Student: Savannah Pewett, McNair Scholar**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

We conducted a cross-cultural study, hypothesizing that United States adults would have more negative police perceptions than St. Croix adults because of the intense U.S. media focus on citizen-police interactions. We also compared African American and Caucasian participants. United States and St. Croix adults ( $n = 117$ ) provided their perceptions of a researcher-created narrative describing the robbery of a backpack and a police apprehension. Participants also responded to several scales to assess perceptions of police officers, perceptions of neighborhood culture, and symbolic racism beliefs. U.S. mainland residents, compared to St. Croix residents, had more favorable perceptions of the police despite being more likely to report negative interactions with police officers. This unexpected finding may be the result of St. Croix residents' frustration with the high crime rates that characterize St. Croix society. Although their perception of the police differed, adults from both cultures reported very similar reactions to the criminal narrative. Caucasians, compared to African-Americans (across both cultures), had more positive perceptions of and past experiences with police. These findings match previous research suggesting that experience and perceptions go hand-in-hand and mirror the police-citizen tensions commonly reported in today's society. Symbolic racism scores predicted more positive perceptions of police. This study provides a rare comparison of these two cultures and reveals the complexity that drives perceptions of police officers.

## Adults' Emotional and Cognitive Reactions to Self-Reported Stereotype Experiences

*Journal of Psychological Inquiry, 2017, In press.*

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; TRiO McNair Research Symposium, Columbia, South Carolina, June 2016; Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

*Winner, CEPO Student Research Award in Minority Issues, SEPA Annual Meeting, March 2017*

**Student: Claudia A. Salazar, McNair Scholar**

Honors Thesis Committee: Merry Sleight, Ph.D.; Tara Collins, Ph.D.; and Donna Nelson, Ph.D.

CAS – Department of Psychology

Stereotypes are associated with a multitude of negative consequences for the stereotyped individual. Recently researchers have demonstrated that positive outcomes are also possible. Participants ( $n = 206$ ) responded to the Everyday Discrimination Scale (EDS), the Social Dominance Orientation Scale (SDO), and the Heightened Vigilance Scale (HVS). We asked adults to describe two times when they experienced stereotyping: once with a negative and once with a positive outcome. We saw no race differences in responses to the request for the negative situation; however, 82% of Caucasians and only 57% of African-Americans provided a positive situation. The most frequent positive outcomes were motivation to disprove the stereotype, personal growth, or strengthening of a relationship. The social setting of the situation and race seem to have a powerful impact on the specific outcome. For example, narratives revealed that the negative stereotyping most often occurred in a social setting, while the positive outcome stereotyping most frequently occurred one-on-one. SDO, EDS, and HVS altered how individuals emotionally responded to and thought about stereotyping situations; however, the outcome (positive or negative) of the situation had little impact on perceptions.



# HONORS THESES

The Honors Program at Winthrop University is designed to enrich the college experience for highly talented and motivated students. Through interactions with outstanding faculty and peers, a vital community of scholars is created that embraces the pursuit of knowledge for the enhancement of intellectual and personal growth. Founded in 1960, Winthrop's Honors Program is one of the oldest in the nation. Then President Charles S. Davis, realizing the importance of an enriched education for high-achieving students, appointed faculty member John S. Eells as the founding director of our Honors Program. Eells became a member of a national organization that was formed as a clearinghouse for information on honors activities, the Inter-University Committee on the Superior Student (ICSS). The ICSS received funding from the Carnegie Foundation, the National Science Foundation and the U.S. Office of Education to help establish honors programs at colleges and university across the U.S. When the ICSS disbanded in 1965 for lack of external funding, several members of that group formed the National Collegiate Honors Council (NCHC), in 1966, which was committed to maintaining a professional association of honors educators. Eells was elected the fourth President of NCHC in 1970. Over the years, the Winthrop University Honors Program has continued to flourish, and in the early 1980s, the program was divided into a program for entering freshmen and a program for upperclassmen. At that time, there was a national trend toward creating "learning communities" (see Gabelnick, 1986, for a review), and the Winthrop honors administration created the Clustered Learning Units for Educational Success (C.L.U.E.S.) program, in which new honors freshmen enrolled in a cluster of three honors classes together. This program later became the Freshman Honors Program. Seeing the need for a more cohesive honors experience, the honors administration under the leadership of Anthony J. DiGiorgio combined the programs in 1997. Today, the Honors Program at Winthrop University enrolls approximately 350 students from each of the degree-granting colleges of the university. To graduate with an Honors Program Degree, a student must complete 23 hours of honors courses, which includes an honors thesis, while maintaining at least a 3.30 grade point average. The honors thesis is the culminating experience for an Honors Program student, in which he or she works collaboratively with a faculty director and two faculty readers to produce a project that evaluates knowledge, concepts and methodology, examines major issues, integrates complex information, and develops and appropriately defends an argument. While most students complete the honors thesis during the course of the senior year, some students complete the project earlier in their academic careers. The Honors Program students and I would like to thank the faculty members who have worked as honors thesis directors and readers throughout this process. Their expertise, guidance and commitment should be highly commended.

## **Kathy A. Lyon, Ph.D.**

Director of the Honors Program

## **2016 – 2017 Honors Advisory Committee**

Kathy Lyon, Ph.D., Director, Honors Program

Michelle Dubert-Bellrichard, M.S.L.S., Dacus Library

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Leslie Bickford, Ph.D., ex officio, Director, ONCA

Gloria Jones, Ph.D., ex officio, Dean, University College

Karen Kedrowski, Ph.D., ex officio, Dean, College of Arts and Sciences

## Examining Salinity Tolerance of *Escherichia coli* in Beach Sand Using a Microcosm Approach

*Association of Southeastern Biologists (ASB) Conference, Montgomery, Alabama, March 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Leigha Stahl, McNair Scholar**

Honors Thesis Committee: Victoria Frost, Ph.D.; Matthew Heard, Ph.D.; and Kristi Westover, Ph.D.

CAS – Department of Biology

*Escherichia coli* (*E. coli*) is a common bacterium that thrives in many environments. Due to its widespread prevalence, it is often used as an indicator species for fecal pollution and other pathogens. One place where it is not often looked for is oceanic beaches, because *E. coli* is inhibited by salt. However, recent research has shown that *E. coli* can be found in sand at oceanic beaches. To investigate its survival in sand and the effects of salinity, we created a microcosm simulating the intertidal zone of an oceanic beach. Using this approach, we examined how salinity (0-6% NaCl) affected persistence of multiple strains of *E. coli*. We observed that salinity significantly decreased the number of *E. coli* colonies found in our microcosms and in both of our strains, which suggests that *E. coli* is inhibited by salinity. However, we also found that *E. coli* was persisting at all salt concentrations, including treatments exceeding average oceanic salinity (3-4% NaCl), although our two strains differed in persistence levels. Collectively, our findings suggest that *E. coli* may be able to persist on oceanic beaches. However, they also suggest that long-term persistence may be dependent on the strain.

## Marketing Ethics and Fluff Pulp

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Cera T. Crowe, McNair Scholar**

Honors Thesis Committee: Sabrina Habib, Ph.D.; Padmini Patwardhan, Ph.D.; and Chad Dresbach, M.F.A

CAS – Department of Interdisciplinary Studies

(IDVS 490 – Habib)

A case study was conducted to further understand the fundamentals of sustainability issues pertaining to a raw material called fluff pulp. Fluff pulp is a chemical cellulose long fiber used for products that require high absorbency. Examples of these products include feminine hygiene products, baby diapers, and adult incontinence products. This product category is far from achieving a transparent supply chain due to lack of communicative marketing and packaging. This break in the communication model may cause extreme ethical implications for some of the world's most vulnerable populations. Environmental and social issues will be coded to evaluate the most pressing issues regarding the material fluff pulp.

## Women's Identity Salience and Stereotyping

*Southern Regional Honors Council (SRHC) Conference, Asheville, North Carolina, March 2017*

**Student: Tollie J. Schultz, McNair Scholar**

Honors Thesis Committee: Tara Collins, Ph.D.; Merry Sleigh, Ph.D.; and Jeffrey Sinn, Ph.D.

CAS – Department of Psychology

Contemporary research utilizing Social Identity Theory has suggested that components of an individual's self-identity are derived from the larger social groups that they perceive membership to, particularly in the case of social minorities. A smaller body of study has also expanded this investigation to examine the relationship between individual's endorsement of self-stereotypes and group stereotypes as a whole. However, the majority of extant studies have yet to adopt a more intersectional perspective that considers how the presence of multiple social identities may influence an individual's sense of identity and use of stereotypes. The following study aimed to address these existing gaps in stereotyping literature by considering the role of identity salience among those who belong to multiple minority groups. More specifically, we explored the differences in how women who belonged to multiple social groups perceived stereotypes about themselves and others by manipulating either their gender or sexual orientation identity-salience. Female participants were randomly assigned to either the control or a priming condition before completing a self-stereotyping measure. Participants were then successively asked to rate how much they agreed with stereotypes about women, bisexual women, and lesbian women in general. Data from each condition was analyzed and compared in order to discern the differences that emerged among participants who held otherwise similar social identities

## "No Pain Andrew Lane," A Creative Piece

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Alexia Schaeffer**

Honors Thesis Committee: Matthew Stern, Ph.D.; Dustin Hoffman, Ph.D.; and Laura Glasscock, Ph.D.

CAS – Department of Biology

"No Pain Andrew Lane" is a traditional short story which blends the very technical world of medicine with human experience. Dr. Rita Marcus, a pediatric physician and the focal character, receives news that a long-time patient of hers, Drew Lane, has jumped off a second-story balcony. The boy is afflicted with a rare disease, Congenital insensitivity to pain with anhidrosis (CIPA), meaning he is biologically incapable of feeling pain. Drew's inability to feel pain allows him to commit daring acts and be fearless, a trait which Rita covets as she grapples with a failing marriage and an unattainable future. "No Pain Andrew Lane" is chiefly a story about pain and fear, and how the physical and emotional implications of these feelings can shape human lives.

## To Be Caught: A Collection of Poetry and Short Fiction

*Southern Regional Honors Council (SRHC) Conference, Asheville, North Carolina, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Emily Thomas**

Honors Thesis Committee: Evelyn Weeks, M.A.; Dustin Hoffman, Ph.D.; and Leslie Bickford, Ph.D.

CAS – Department of English

For my honors thesis, I am completing a collection of short fiction and poetry. I was compelled to write a creative thesis since I plan on teaching creative writing. My collection of writing was inspired by the strong characters in my own life and the impact that they had on the way that I view the world, including the way I perceive my role in the world. In my short fiction work, “By The Antlers,” a college-aged woman visits her grandfather in rural Arkansas in search of answers. Her grandmother had died a few years previously and though her grandparents had divorced before she was even born, the young woman believes that her grandfather will be able to answer some of the questions her grandmother left unanswered. Most poignant of all – she hopes that she will be able to persuade her grandfather to open up enough to tell her the details surrounding the divorce. In one of my poems, “(Fe)male,” the speaker explores the relationship of a mother to her children. I was inspired to write this poem after finding out some of the sacrifices that my own grandmother had to make in order to raise four children, including a disabled child, as a single mother. I hope that my audience will gain a sense of the quiet strength found in femininity and motherhood. Through language, form, and images portrayed, my writing aims to create a connection between the reader and the characters in my life who have impacted me.

## Understanding the Limitation of Genetic Testing Using the Hemoglobin S Test as a Model

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Camerun C. Washington, McNair Scholar**

Honors Thesis Committee: Kathryn Kohl, Ph.D.; Darren Ritzer, Ph.D.; and Dwight Dimaculangan, Ph.D.

CAS – Department of Biology

With the completion of the Human Genome Project in 2000, our knowledge of the human genome has increased exponentially, along with a steady accretion in the accessibility of genetic testing. With advances in genetics glamorized as ideas of “designer babies,” eradication of disease, and phrases like “my genes made me do it,” it is important to understand what types of information can and cannot be gathered through genetic testing. Thus, this project aims to assess the perceptions of the limitations of genetic testing by using the sickle cell blood test as a model. A 45-question assessment was distributed electronically, with participant results assessed and scaled to identify satisfactory understanding of the limitations of genetic testing.

## Factors of Malnutrition in Children Under the Age of 5: A Systematic Review and Comparison of Diarrheal Disease Research Before and After 2000 and Oral Rehydration Therapy as a Treatment for Diarrhea in the Andean Countries of South America (Peru and Bolivia)

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Julia Poppell**

Honors Thesis Committee: Judy Thomas, M.S.; Lauren Sastre, Ph.D.; and Duha Hamed, Ph.D.

CAS – Department of Human Nutrition

Diarrheal disease, a condition in which three or more loose stools are passed per day, continues to be a significant contributor to malnutrition in children under the age of five in developing countries, including Peru and Bolivia, countries located in the Andean region of South America. This disease is often caused by a variety of pathogens, including – but not limited to – *Vibrio cholerae*, *Cryptosporidium parvum*, *Norovirus*, *Rotavirus*, and *Escherichia coli*. However, the research and literature about these diarrhea-causing pathogens have changed significantly over the years for many reasons. This review analyzes how the literature and statistics on infection and pathogen-caused diarrheal disease in children under the age of five in Peru and Bolivia have changed over time and for what reasons. It also analyzes trends in the use of oral rehydration therapy (ORT) as a treatment for diarrheal disease in both countries.

## Financial Literacy and Retirement Preparedness of South Carolinians

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Nicholas A. Cunningham**

Honors Thesis Committee: Philip Gibson, Ph.D.; Yuanshan (Jimmy) Cheng, Ph.D.; and Charles Alvis, M.B.A.

CBA – Department of Accounting, Finance, and Economics

I discussed the evolution of retirement saving from defined benefit plans to defined contribution plans and reviewed other relevant research on financial literacy and retirement preparedness. I examined financial literacy in the United States relative to that of residents of South Carolina utilizing the National Financial Capability Study (NFCS). The results of my study show that South Carolina scored lower than the rest of the United States on the questions in the NFCS related to financial literacy and retirement. Furthermore, I explained how this lower level of financial literacy translates to lower retirement savings and less retirement preparedness as shown in the National Financial Capabilities Study results. Finally, I discussed potential new initiatives for financial literacy on the state level and explained how increased education related to financial literacy in the public school system in South Carolina could result in increased financial literacy in the short run and increased retirement savings in the long run.

## The Effect of Thinned Trabeculae on Bone Mechanical Properties, a 3D Printed Model Study

*Southern Regional Honors Council (SRHC) Conference, Orlando, Florida, March 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Margaret Arielle Black**

Honors Thesis Committee: Meir Barak, Ph.D., D.V.M.; Laura Glasscock, Ph.D.; and Matthew Stern, Ph.D.

CAS – Department of Biology

Trabecular bone structure is complex and unique; no two tissues are the same. This introduces a significant problem when trying to measure trabecular tissue strength (the maximum load before structure failure). Since mechanically testing a sample to find its strength involves loading until failure, each sample can be tested only once and thus the precision of trabecular bone tissue strength measurements tends to be low. As trabecular bone tissue strength is an important indicator for poor bone quality (e.g., osteoporosis), an accurate and precise measurement of its strength has clinical importance. Here, we are using a novel technique, namely 3D printing, to reproduce a large number of identical trabecular bone structure replicas. In this study, we tested in compression ( $n = 30$ ) a cubical 3D-printed sample reconstructed from the metacarpal head of a chimp. The same sample was tested again after we had manipulated the model and thinned the trabeculae to simulate the onset of osteoporosis (decrease of 9.1% in bone volume). Our results demonstrate that the original “healthy” trabecular structure is significantly stronger than the “osteoporotic” one (4.13 MPa and 2.20 MPa, respectively). This study demonstrates that 3D-printing is a novel and valuable tool for testing the mechanical properties of trabecular structures and the prediction of their failure. Furthermore, the trabecular models were exported into a finite element modeling software (Strand 7) to visualize the strain and stress distributions. The mapping of such data will provide insight into which areas will break first, leading to tissue failure.

## A Study in Overcoming the Known Matrix Interferences of Phosphate Using the Standard Dilution Analysis Technique with Flame Atomic Emission

*Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Atlanta, Georgia, March 2016*

**Student: Emily Watson**

Honors Thesis Committee: Cliff Calloway, Ph.D.; Clifton Harris, Ph.D.; and Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552H – Hanna)

Standard Dilution Analysis (SDA) is a novel spectroscopic calibration method that can be applied to most instrumental techniques that are capable of monitoring two wavelengths and will accept liquid samples. It combines traditional methods of calibration curve, standard addition, and internal standard, therefore correcting

for matrix interferences and fluctuations due to changes in sample size, orientation, or instrumental parameters. SDA is performed by combining two solutions in a single container: the first solution contains 50% unknown sample and 50% of a standard mixture (containing the analyte and an internal standard) and the second solution contains 50% unknown sample and 50% solvent. Solutions of calcium will be used as the analyte, with a manganese internal standard. The data collection scheme has been modified to monitor the individual internal standard and calcium signals to create a plot of the ratio of the calcium and manganese signals against the reciprocal of the manganese signal. The analyte concentration in the sample will be determined from the ratio of the slope and intercept of the resulting plot. Phosphate is a well-known interferent in the determination of calcium in complex samples, such as vitamin tablets and calcium supplements. Calcium has also been shown to produce non-linear standard addition plots in the extrapolated region when phosphate is present. The SDA method will be applied to the determination of calcium in over-the-counter vitamin and calcium supplements containing phosphate, using an inexpensive flame atomic emission spectrophotometer.

## The Impact of the No Child Left Behind Act on the Reauthorization of the Elementary and Secondary Education Act

*The Carolinas Conference: Joint Meeting of the North Carolina and South Carolina Political Science Associations, Winthrop University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Corrina Brown**

Honors Thesis Committee: Michael Lipscomb, Ph.D.; Stephen Smith, Ph.D.; and Kathy Lyon, Ph.D.

CAS – Department of Political Science

(PLSC 490H – Lipscomb, Smith)

The passing of the 2002 reauthorization of the Elementary and Secondary Education Act (ESEA), known as the No Child Left Behind Act (NCLB), stands as one of the most noteworthy moments of bipartisanship in the history of education. The goal of the Act was to hold both school administrators and educators accountable for improving educational opportunities for all students, especially those who came from low-income and minority backgrounds. However, the optimism behind NCLB's ability to meet goals quickly dissipated when the provisions of the Act seemed to produce more challenges than benefits for the students it was intended to help. As a result, the public and policymakers pushed for a more effective solution, but attempts failed year after year, due to the differing perspectives of influencing actors. The initial reauthorization of NCLB or another version of ESEA was set to take place in 2007; however, it was not until 2015 that a reauthorization occurred, with the passing of the Every Student Succeeds Act (ESSA). Almost 14 years after the initial passing of NCLB, Congress was finally able to come together once again and agree on another pivotal piece of education legislation. I argue that the delayed reauthorization of ESEA was influenced by a polarization of the public's political ideologies, the partisanship of members of Congress, and the role of education coalitions and think tanks in the education policy arena. This research examines those effects and how they led to the passing of ESEA, another piece of legislation that appears to present more challenges, thus presenting uncertainty for the future of education in America.

## Biological Evaluation of Novel Benzisoxazolo[2,3-a]azinium Tetrafluoroborates as Anticancer Agents

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the NCI and NIGMS of the National Institutes for Health and the National Science Foundation*

**Student: Theresa Melendez, McNair Scholar**

Honors Thesis Committee: Takita Sumter, Ph.D.; James M. Hanna Jr., Ph.D.; and Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Ellipticine has been effectively used to treat various types of cancer. This aromatic, planar, antineoplastic drug works primarily by DNA intercalation, and its derivatives represent promising options for cancer drug discovery. DNA intercalators are small molecules that can bind to DNA between base pairs, resulting in the inhibition of replication and providing a viable option for cancer treatment. Several novel benzisoxazolo[2,3-a] pyridinium and quinolinium tetrafluoroborate salts with structural characteristics similar to ellipticine were evaluated and shown to effectively kill colon cancer cells at single-digit micromolar concentrations. Previously, the benzisoxazolo[2,3-a]pyridinium compounds were evaluated as possible anticancer agents, and various R-groups were tested on the structure to come to the conclusion that a methyl substituent is the most successful. To expand on this work, we evaluated the anti-cancer activity of benzisoxazolo[2,3-a]quinolinium tetrafluoroborate compounds bearing methyl substituents in the 1-methyl, 2-methyl, 3-methyl, and 4-methyl positions and tested them against HCT 116 human colon carcinoma cells. Results were analyzed from a mechanistic perspective, and our preliminary data indicate limited survival of colon cancer cells when treated with 50  $\mu$ M drug. Additionally, the toxicity assays employed demonstrate an inverse correlation between concentration of drug and cell survival. These findings suggest that benzisoxazolo[2,3-a]quinolinium tetrafluoroborates are an effective lead for better understanding molecular cancer pathways; additional studies will be aimed at detailed analysis of the DNA binding mechanism of these compounds and expansion of our drug library.

## Reading on Target: A New Literacy Strategy

*Southern Regional Honors Council (SRHC) Conference, Orlando, Florida, March 2016*

**Student: Katelyn G. Dodd**

Honors Thesis Committee: Carol Marchel, Ph.D.; Bettie Parsons Barger, Ph.D.; and Cheryl Mader, Ed.D.

COE – Department of Curriculum and Pedagogy

Reading is a key skill for students to be successful in life. According to a study done by the American Educational Research Association, a student who cannot read on grade level by third grade is four times less likely to graduate than one who scores proficient in third grade. There are five parts of reading that students must master – phonemic awareness, phonics, fluency, vocabulary, and comprehension. This

research is about the effects of a new literacy strategy designed to target reading comprehension through vocabulary improvement. This strategy, known as “Reading on Target,” utilizes a graphic organizer focused on increasing student vocabulary. This organizer addresses three aspects of vocabulary – definition, proper use of the word, and importance of the word. Research shows that developing new vocabulary positively impacts reading comprehension and the overall reading level of the student. Reading on Target has been tested with a group of fourth-grade students who scored below grade level on standardized tests at the end of third grade. Initial data indicate that Reading on Target positively impacted the reading comprehension and overall reading level of the participants.

## Utilizing Bioinformatics for Meiofaunal Community Composition Analysis

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDEa Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Alex Corder**

Honors Thesis Committee: Julian Smith III, Ph.D.; Cynthia Tant, Ph.D.; and Jason Hurlbert, Ph.D.

CAS – Department of Biology

The emergence of molecular analysis as a means of classification for meiofaunal communities based on genetic similarity has prompted the development of analytical technology to understand and map genetic variation more efficiently. While this technology has already affected meiofaunal research, the establishment of such a bioinformatics pipeline has remained a cumbersome process because of the wide variety of processing tactics. As the demand for faster taxonomic classification and phylogenetic placement continues to grow, high-throughput data processing has become a necessity to meiofaunal phylogenetic investigation. Accordingly, we assembled a functioning bioinformatics pipeline for the assessment of meiofaunal community variation based on the 18S ribosomal gene. Using the Linux software package QIIME, the established pipeline was successfully tested with IonTorrent sequences of soil fauna obtained by PCR of environmental DNA from the V9 hypervariable region of the 18S gene. These sequences, contributed by teachers participating in the INBRE-RET program, were compared and clustered into operational taxonomic units and matched to sequences with defined taxonomy. Finally, the sample was organized into a current phylogeny of the members of the sampled community. The specificity of taxonomic assignment was variable, with some organisms only assigned to a phylum, yet this pipeline significantly reduced the time needed to inventory community composition. The pipeline will continue further testing with a set of data from several meiofaunal communities contributed by a colleague. This customized technology is steadily becoming a feasible tactic for scientists to utilize in community analysis, and its rapid processing will allow researchers to more readily understand a current phylogenetic composition of an ecosystem.



## Frivolous Societies: Realism and Corruption in Henry James's and Edith Wharton's Lives and Novels

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Anne T. Cushman**

Honors Thesis Committee: Leslie Bickford, Ph.D.; Kelly Richardson, Ph.D.; and Gloria Jones, Ph.D.

CAS – Department of English

Literary realism draws unquestionable New Historical ties. To read a novel or story with intent of depicting life as it truly is, it is practically impossible not to draw on the history surrounding the time and plot of the story. These stories beg the reader to compare their own lives with the lives of the characters. Such is the case with the works of Henry James and Edith Wharton. Both realist writers of the 19<sup>th</sup> and 20<sup>th</sup> century, these authors focused on the perils of upper class society. James and Wharton, themselves being members of the aristocracy, seemed to have no problem representing the superficial and nefarious aspects of their lives. Forming a close friendship throughout their life, Wharton and James bonded through their mockery of society. Edith Wharton, in talking about her writing once said, "A frivolous society can acquire dramatic significance only through what its frivolity destroys." The duo created stories with similar themes and motifs and even characters, Wharton even naming one of her characters after one of his. James' *Portrait of a Lady* and Wharton's *Age of Innocence* particularly play off of each other in their representations of the time periods. Henry James and Edith Wharton use realism to create a stark commentary on societal corruption and demonstrate the battle between duty and free will that they themselves faced in their own lives.

## Effects of Nutrition and Physical Therapy On Weight Bearing Joint Replacements

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Melody Sheets**

Honors Thesis Committee: Jessica Boulware, M.A., M.S.; Leslie Thompson, M.S.; and Lauren Sastre, Ph.D.

CAS – Department of Human Nutrition

This thesis paper examines the effects of nutrition and physical therapy on weight bearing joints that have been replaced. Modern medicine allows people to live longer than ever before. With living longer, issues such as joint replacements have arisen. Recently, there has been an obesity epidemic, which may lead to the increased need for weight bearing joint replacements. The effects of diet and nutrition on weight and the effects weight has on joints have been examined by way of literature review. There has been research on physical therapy following joint replacement. The effects of physical therapy on joint replacement patients are positive and have been investigated by way of literature review. Both adequate nutrition and physical therapy are likely to be important to the best outcome of a joint replacement surgery. There have been no studies conducted on the effects of both of these aspects combined on patients. Included in the theses is an

experimental design to study the effects of nutrition and dietetic education before, during, and after a joint replacement, and the effects of physical therapy on the replaced joint. The application of both education and physical therapy could be beneficial to better outcomes of joint replacements for patients undergoing the surgery. If individuals were not overweight or obese, the joint replacement surgery would have better and more long lasting outcomes. The conclusion for the study will not be found, but hopefully, in the future the experiment could be completed and the results published.

## Visible-Light Promoted Reactions of Potassium Organotrifluoroborates with Benzalaniline

*Gulf Coast Undergraduate Research Symposium, Rice University, October 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Winner, Outstanding Presentation in Photocatalysis, Gulf Coast Undergraduate Research Symposium, Rice University, October 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Davis P. Plasko**

Honors Thesis Committee: James M. Hanna Jr., Ph.D.; Robin K. Lammi, Ph.D.; and Takita F. Sumter, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552H – Hanna)

The  $\alpha$ -arylamine motif is present in about 10% of the top 100 drugs sold in the United States. A way to form this motif is the addition of organometallics to aromatic imines. In many cases, this approach is limited by the poor electrophilicity of the azomethine carbon of imines, which causes undesired enolization, reduction, or coupling reactions. Recently, the use of visible light combined with a suitable photocatalyst to promote key bond-forming steps in organic synthesis has emerged as a viable strategy to achieve a number of important synthetic transformations. The photocatalyst involved is often a ruthenium or iridium polypyridyl complex, which absorbs light in the visible range to give a relatively long-lived excited state. This photo-excited catalyst then mediates the formation of radicals from organic substrates, through a series of single-electron transfer (SET) events; the organic radicals thus generated engage in downstream reactions, leading to the final product(s). Due to the generally low toxicity, relative stability, ease of synthesis, and functional group tolerance of potassium organotrifluoroborates, we have begun exploring this strategy as a means to effect formal additions of these organometallics to aromatic imines. We have found that irradiation of an argon-sparged dichloromethane solution of potassium allyltrifluoroborate and benzalaniline in the presence of *Ir-dF(CF<sub>3</sub>)-dtb* at room temperature using blue LED floodlights (450 nm) produced *N*-Phenyl- $\alpha$ -2-propen-1-yl-benzenemethanamine in 70% yield. Control experiments established that light and catalyst are required for reaction success. Various other potassium organotrifluoroborates have been tested under these conditions, with various degrees of success.

## Validation of siRNA against LPA Receptor 4 to Analyze Retinal Ganglion Cell Guidance

*Supported by grants from the National Eye Institute of the National Institutes of Health and the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Victoria Leroy**

Honors Thesis Committee: Eric Birgbauer, Ph.D.; Matt Stern, Ph.D.; and Laura Glasscock, Ph.D.

CAS – Department of Biology

We are using chicken embryos to study the developing nervous system, specifically the developing optic nerve. The optic nerve is made up of axons from retinal ganglion cells, or RGCs, which are neurons that transmit visual information from the eye to the brain. RGCs find their destinations in the brain by relying on growth cones to detect environmental cues. Lysophosphatidic acid (LPA) may be one such environmental factor that could serve as a repulsive guidance cue. There are six known G-protein coupled LPA receptors, and previous work has suggested that five of the receptors are not involved in axon guidance, leaving lpar4 as the likely mediating receptor. By designing siRNAs against lpar4, we can reduce its expression, which allows us to determine its role in axon guidance. We are testing our constructs by transfecting the siRNA into a neuroblastoma cell line, which overexpresses lpar4 with a myc protein tag. In order to validate the siRNA, RNA will be isolated from the transfected B103 cells and quantified through qRT-PCR. A decreased concentration of lpar4 RNA compared to the non-transfected B103 cells would suggest that our siRNA was successful in knocking down the RNA encoding lpar4. The lpar4 protein levels are analyzed via Western blot against the myc tag to further demonstrate lpar4 siRNA knockdown. After successful validation, we will inject our siRNA into the developing eyes of chicken embryos and investigate growth cone response to LPA in the absence of lpar4.

## A Mathematical Model of Chronic Myeloid Leukemia and Treatment Using Gompertzian Growth

*Regional Mathematics and Statistics Conference, University of North Carolina, Greensboro, November 2016; Joint Mathematics Meeting (JMM), Atlanta, Georgia, January 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Lindsay K. Bradley**

Honors Thesis Committee: Kristen Abernathy, Ph.D.; Trent Kull, Ph.D.; and Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

Chronic Myeloid Leukemia (CML) is a prevalent type of cancer in which the presence of cancer stem cells is well studied. In this paper, we modify existing Gompertzian growth models to study the dynamics of CML and the effects of the body's natural defenses coupled with Imatinib and IFN-alpha treatments on CML. In the absence of treatment, we demonstrate that the cure state is always unstable. We then present conditions on parameters to guarantee a locally stable cure state with treatment. We conclude with a discussion of our results and future work.

## Expression, Purification and Crystallization of the Xanthomonas Avirulence Proteins, AvrBs1.1 and AvrBs7, and their Target in Capsicum annuum, the Transcription Factor WRKY-1

**Student: Michala Tesney**

Honors Thesis Committee: Jason Hurlbert, Ph.D.; Takita Sumter, Ph.D.; and Matthew Stern, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552H – Hanna)

Brown spots and leaf loss of *Capsicum annuum*, a pepper found in the Americas, are caused by prolonged activation of the plant's defense mechanisms to bacterial infection, resulting in a phenomenon called the hypersensitive response. In the hypersensitive response, the plant "walls off" the infected tissue with lignin, and then a variety of chemical processes occur within the lignified zone, resulting in the death of both bacterial and plant cells. Certain species-specific bacterial pathogens inject effector proteins with different activities into the cytosol of the host to prevent activation of the plant's defense mechanisms. Our work focuses on the effector proteins AvrBs1.1, a dual-specificity protein tyrosine phosphatase produced by *Xanthomonas euvesicatoria*, and AvrBs7, a protein tyrosine phosphatase produced by *Xanthomonas gardneri*. Recent work has identified the transcription factor WRKY-1 as a possible target for AvrBs1.1. We hypothesize that AvrBs1.1 dephosphorylates WRKY-1 in the cytosol, thereby preventing it from entering the nucleus and activating the genes of the plant's defense response. The method of protein crystallization will be used to determine the protein-protein interactions within the plant cell.

## Individualized Literacy Instruction for First Graders in Poverty

**Student: Julia A. Lusk**

Honors Thesis Committee: Bettie Parsons Barger, Ph.D.; Crystal Glover, Ph.D.; and Scot Rademaker, Ph.D.

COE – Department of Curriculum and Pedagogy

Within the field of education, Hagans and Good state that children in poverty have fewer opportunities to engage in literacy-enriching activities. They go on to say that children in poverty are at a disadvantage for language development and reading, as compared to their peers from families of mid- to high socioeconomic status (SES). Unfortunately, students who struggle with reading in early grades are at significantly greater risk to struggle academically, creating a large gap in skills. Research shows that children learn more efficiently across subjects when their learning is individualized. Children in poverty need individualized instruction from a highly qualified teacher, or an assistant or volunteer who is under close supervision from the host teacher. This study explores the impact of balanced, individualized literacy instruction, with meaningful reading experiences, guided by relevant assessment data. Three students in poverty met weekly for 30 minutes with a researcher for individualized literacy instruction. The findings are highlighted in this action-research study.

## The Structure of hSK1 with Bound Inhibitors is Crucial in the Regulation of Cancer

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Justin S. Hutchinson**

Honors Thesis Committee: Jason Hurlbert, Ph.D.; Christian Grattan, Ph.D.; and Julian Smith III, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552H – Hanna)

Human sphingosine kinase 1 (hSK1) is a lipid signaling enzyme that catalyzes the phosphorylation of a pro-apoptotic lipid signaler (sphingosine) into an anti-apoptotic lipid signaler (sphingosine-1-phosphate). These two lipid signalers play an important role in the sphingomyelin degradation pathway, as they can code cells for apoptosis or proliferation in response to an extracellular stressor. In a cancerous tumor, where common treatments are chemotherapy and radiation therapy, the sphingomyelin degradation pathway will be initiated due to cellular damage during treatment. Studies have also shown that hSK1 is overexpressed in a number of cancerous tumors. Therefore, since there will be higher levels of sphingosine and higher levels of hSK1, there will be increasing amounts of sphingosine-1-phosphate present, coding the cancerous cell for proliferation. In order to combat this pathway, the successful development of sphingosine-like inhibitors is needed, along with the structure of the inhibitor-bound enzyme. In this study, recombinant hSK1 was expressed in bacterial culture, followed by purification via a three-step protocol. To date, hSK1 has been successfully expressed in *Escherichia coli* BL21 cells; the protocol for purification is still being manipulated to yield an adequate amount of pure protein for crystallization trials. Once protein of adequate purity is obtained, it will be crystallized in complex with inhibitors to determine the structure of the inhibitor-bound enzyme via X-ray diffraction.

## Evaluation of Sphingosine Kinase Inhibitor Derivatives as Antimicrobial Agents

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Michelle Corley**

Honors Thesis Committee: Christian Grattan, Ph.D.; Robin K. Lammi, Ph.D.; and Victoria Frost, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552H – Hanna)

According to the World Health Organization, antimicrobial resistance is present in every country, therefore putting people all over the world at risk for infections that could once be treated with simple doses of antibiotics. Antimicrobial resistance is defined as occurring when microorganisms change due to exposure to antimicrobial

drugs. As a result, the antimicrobial drugs become ineffective and infections persist in patients, potentially spreading to others and even causing death. While rates of antimicrobial-resistant strains of bacteria are rising rapidly, the development of new antimicrobial agents has plateaued. In fact, most of the antibiotic classes on the market today were developed in the 1950s, with only two new classes of antibiotics entering the market within the past forty years. Recent research has indicated that fatty acids characteristic only to eukaryotes, sphingolipids, exhibit innate antimicrobial properties. Sphingolipids are the substrates for the enzyme sphingosine kinase 1 (SK1), which has been a popular target enzyme for cancer research; our group has previously synthesized many potent, bioactive inhibitors for SK1. Based on the findings that sphingolipids possess innate antimicrobial properties, we now focus on re-purposing previously synthesized SK1 inhibitors as potential antimicrobial agents. By making functional-group modifications to such inhibitors, we have shown that certain SK1 inhibitors exhibit antimicrobial properties. Our research efforts have focused on identifying promising antimicrobial compounds and modifying them synthetically to optimize their impact.

## Controlling Oct4 Expression Levels Using Invitrogen's GeneSwitch™ System

*McNair TriO Research Symposium, Columbia, South Carolina, June 2016; 22nd Annual SAEOPP McNair/ISSS Scholars Research Conference, Atlanta, Georgia, June 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Autumn S. Leggins, McNair Scholar**

Honors Thesis Committee: Matthew Stern, Ph.D.; Nicholas Grossoehme, Ph.D.; and Jason Hurlbert, Ph.D.

CAS – Department of Biology and Department of Chemistry, Physics, and Geology

Oct4 is a transcription factor that is crucial for the induction and retention of pluripotency in pluripotent stem cells. The potential for Oct4 to regulate the developmental potency of multipotent stem cells like adipose-derived mesenchymal stem cells (ADSCs) is not well understood. One approach to explore Oct4's role would be through the use of cellular assays to control the expression of Oct4. This can possibly be accomplished by introducing a biological switch and the gene of interest into ADSCs. In this project, the GeneSwitch™ System was used to ultimately induce Oct4 expression. Oct4 was extracted from a pEX-K4-Oct4 plasmid (from Eurofins Genomics) that contained the gene of interest and was inserted into one of the GeneSwitch™ System plasmids that has the same recognition sites as those used to remove Oct4 from the pEX-K4-Oct4 plasmid. The newly combined GeneSwitch™ plasmid with Oct4 can then be placed into ADSCs, along with the plasmid that will act as a biological switch. With this system put into ADSCs, it is expected that Oct4 levels will be successfully controlled. Once controlled, investigations can be completed to determine how Oct4 expression levels influence the developmental potency of ADSCs. Gaining the ability to control Oct4 will also open up the opportunity to test other hypotheses, including determining how Oct4 expression levels influence the developmental potency of other cell types. This knowledge could then be applied to tissue engineering and regenerative medicine strategies that rely upon the ability of ADSCs to produce specified cell lineages.

## Frankenstein: Can the Truth Be Revealed?

**Student: Kellsie Edwards**

Honors Thesis Committee: Leslie Bickford, Ph.D.; Casey Cothran, Ph.D.; and Evelyn Weeks, M.A.

CAS – Department of English

When writing *Frankenstein*, Mary Shelley used her knowledge of science experiments and racial opinions to help demonstrate a view of the monster to the reader. Shelley used a frame story structure to showcase the manipulation of Robert Walton performed by Victor Frankenstein, who can be seen to symbolically represent the bourgeoisie class. As a symbolic representative of the proletariat, Robert Walton is trying to rise to a higher class, and hopes to do so with his exploration of the North Pole. Walton's letters help to show the reader the proletariat's struggle with the bourgeoisie by showing the obstacles he goes through, but when he brings Victor onto the ship, his reverence for the higher class begins to affect his worldview. Walton is continuously manipulated because of his reverence of the bourgeoisie class and his eagerness to rise to that class, meaning that Victor can use the hegemony to control him. Victor proceeds to tell his story to Walton, emphasizing his family's status as bourgeoisie, and thus showing that he has the ability to determine what the proletariat will know. This is evidenced by how he tells the monster's story. The description of the monster shows how Victor creates a false consciousness for the proletariat: by telling Walton that the monster hated his own reflection, Victor reinforces the hegemony that the monster is bad and should be viewed that way. Victor needs to other the monster this way in order to be seen as good and to show that he could not have made such a mistake. As the voice of the bourgeoisie, Victor controls Walton's and the proletariat's sense of reality. The reader may wonder whether the truth can ever be revealed beyond what the bourgeoisie says. The author ultimately concludes that the whole truth of the class system and how it works cannot be revealed until Victor is dead, but the question remains for the reader of whether or not Walton will continue to let the hegemony control his views on the world.

## On the Diameter of Random Subgraphs of Kneser Graphs

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Justin A. Groves**

Honors Thesis Committee: Arran Hamm, Ph.D.; Thomas Polaski, Ph.D.; and Jessica Hamm, Ph.D.

CAS – Department of Mathematics

For natural numbers  $n$  and  $k$ , let  $G = KG(n, k)$  be the usual Kneser graph (whose vertices are  $k$ -sets of  $\{1, 2, \dots, n\}$  with  $A \sim B$  if and only if  $|A \cap B| = 0$ ). In a recent paper, it was shown that if  $n \geq 3k - 1$ , then the diameter of  $G$  is 2; let  $\mathcal{P}$  be the (monotone) graph property that a graph has diameter two (i.e., a graph  $H$  satisfies  $\mathcal{P}$  (denoted  $H \models \mathcal{P}$ ) if and only if  $\text{diam}(H) = 2$ ). Now, let  $G_p$  be the usual binomial random subgraph of  $G$ . In our paper, we determine the threshold probability for  $G$  with respect to  $\mathcal{P}$  as  $n$  approaches infinity, with  $\ln(n) \gg k$ . That is, for  $n$  and  $k$  as described, we determine  $p_o$  so that, with high probability,  $G_p \models \mathcal{P}$  if  $p \gg p_o$  and, with high probability,  $G_p$  does not satisfy  $\mathcal{P}$  if  $p_o \gg p$ .

## Analysis of Phylo-Group Diversity of *Escherichia coli* in Sand Samples Collected from South Carolina Oceanic Beaches

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Savannah A. Moritzky, McNair Scholar**

Honors Thesis Committee: Matthew Heard, Ph.D.; Victoria Frost, Ph.D.; and Matthew Stern, Ph.D.

CAS – Department of Biology

*Escherichia coli* (*E. coli*) is a common bacterial species that can persist in many different environments, including the oceanic beach, and can be an indicator of both fecal and microbial pollution. While the majority of strains of *E. coli* are not pathogenic to humans, certain phylo-groups are associated with virulent strains that could cause disease. Therefore, it is of critical concern that we determine where the *E. coli* that is found in the oceanic beach environment is coming from, and whether it could be potentially harmful to humans. In this study, we used multiplex PCR to identify to which phylo-groups the isolates of *E. coli* belong. This phylo-group classification can help infer the source of pollution. For our analysis, we collected sand samples from South Carolina beaches. We identified environmental isolates of *E. coli* that differ from the laboratory strain and belong to a few distinct phylo-groups. We found *E. coli* in phylo-groups A (human associated), B1, B2, and D or E. Our findings demonstrate that multiple types of *E. coli* can be detected in these environments; further research is needed to determine whether these strains are a public health concern.

## Countless Systems of Communication: The Design Work and Performance of Excerpts from *Tribes* by Nina Raine

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Sarah Stewart**

Honors Thesis Committee: Daniel Gordon, M.F.A.; Janet Gray, M.F.A.; and Sarah Provencal, M.F.A.

CVPA – Department of Theatre and Dance

When thinking about the term "communication," we generally imagine the form we use most often in our daily lives. The conceptualization of that form is dramatically influenced by our families or groups of friends, our tribe(s). In *Tribes* by Nina Raine, Billy was born deaf, but raised by his hearing family to prosper in the hearing world. They did not want his deafness to be the center of his being, so he was never taught sign language and kept away from deaf events. However, in their good intentions, they only managed to make Billy feel lost and a bit alone. Once he meets Sylvia, a woman who was raised in a deaf family and is starting to go deaf, he is given a chance to finally be "heard." He begins to discover that even with all of his family's love there is more to communication than what they have given him. Along with the presentation of a final performance, there will be a complete set and costume design for the entirety of the play that will aid in communicating the themes of the work in question. By watching the performance of some excerpts from *Tribes*, seeing my design work, and reading my summation paper, I hope it can become apparent to people that there is more to communication and the deaf community than what is commonly known and practiced in the hearing world.



## **“Our march is not yet finished”: A Historical Analysis of Civil Rights Literature**

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Mallory Crimi**

Honors Thesis Committee: Gloria Jones, Ph.D.; Leslie Bickford, Ph.D.; and Sherell Fuller, Ph.D.

CAS – Department of English

This thesis examines four speeches on Civil Rights: Booker T. Washington’s “Atlanta Compromise,” Martin Luther King Jr.’s “I Have a Dream,” Malcolm X’s “The Black Revolution,” and Barack Obama’s remarks at the 50th anniversary of the Selma to Montgomery marches. This paper seeks to provide a vivid exploration of the historical Civil Rights movement by exploring these speeches’ requests for action, consideration of the audience members, and rhetorical devices. It draws conclusions about the way that the Civil Rights movement has changed and developed throughout American history, from the late 1800s when Jim Crow Laws were in full swing, to 2017, when our first African American president ended his second and final term.

## **The Effect of Social and Economic Factors on the Environmental Performance Index**

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Shelby Peay**

Honors Thesis Committee: Robert Stonebraker, Ph.D.; Laura Ullrich, Ph.D.; and Gary Stone, Ph.D.

CBA – Department of Accounting, Finance, and Economics

(ECON 306 – Ullrich)

Over the past several decades, environmental performance has become an increasingly important topic globally. While researching environmental factors is important in understanding this topic, it is also necessary to look at the social and economic factors which may influence the environment. This paper explores that relationship by comparing the 2007 and 2015 Environmental Performance Index scores with social and economic factors for a high GDP per capita sample of countries and a low GDP per capita sample in order to determine if changes in environmental performance differ between high income and low income countries. I hypothesize that the high GDP per capita sample will correspond with larger positive growth in environmental performance change, when compared to the low GDP per capita sample. Other variables included in this analysis are 2007 EPI, 2015 EPI, percent change in EPI, 2007 GDP per capita, 2015 GDP per capita, percent change in GDP per capita, educational attainment, the Gini coefficient, industry value added (as a percentage of GDP), merchandise trade (as a percentage of GDP), and population density.

## **Music in the Classroom**

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Vanessa Mosher**

Honors Thesis Committee: Bettie Parsons Barger, Ph.D.; Diana Murdock, Ph.D.; and Crystal Glover, Ph.D.

COE – Department of Curriculum and Pedagogy

Music has been a part of culture for thousands of years. We hear it every day, connecting songs to difficult and exciting times in our lives. Music helps us reminisce on these times and if linked to content, may be able to help students remember this information. Should music be used in the general classroom? This is the question explored in this study. I observed twenty-six kindergarten students and interviewed them to find if using music in my classroom had any effect. Through this literature review and short study, I have found that music helps students retain information, focus better, and makes the learning environment more welcoming. Because of the multitude of benefits that music can have for a classroom, I am arguing that it is worth educators’ time and effort to use music academically and non-academically in the classroom.

## **The Effects of Coastal Renourishment on the Presence of *Escherichia coli***

*Emory STEM Research and Career Symposium, Atlanta, Georgia, September 2016*

**Student: Jordan Lewis, McNair Scholar**

Honors Thesis Committee: Matthew Heard, Ph.D.; Victoria Frost, Ph.D.; and Cynthia Tant, Ph.D.

CAS – Department of Biology

Oceanic beaches are dynamic ecosystems that are constantly changing. One of the main sources of change on oceanic beaches is erosion resulting from winter storms and hurricanes. That erosion is routinely combated by renourishment projects. During renourishment, sand is dredged from offsite locations and placed on the beach in the eroded areas, in an effort to replace lost surface area. Recent studies have shown that both erosion and renourishment can affect the microbial species found on the beach. One important microbial species that is of concern on oceanic beaches is *Escherichia coli*, which can be an indicator of pollution and other pathogens. In this study, we examined how the process of renourishment affected the abundance and distribution of *E. coli* on an oceanic beach in South Carolina. To do this, we collected sand samples from three sections of the beach (i.e., dunes, intertidal, sub-tidal) at 30 sites over a two-year period and examined how *E. coli* varied spatially in presence and abundance across the beach. Using this approach, we determined that *E. coli* was present in all locations across the beach, but was significantly influenced by renourishment. In addition, we evaluated the properties of sand grains, in order to correlate trends between *E. coli* abundance and grain properties. We also determined that the effects of renourishment were reduced over time, but not entirely diminished. Collectively, our findings indicate that renourishment has an effect on the abundance and distribution of *E. coli*, but more work is needed to fully understand this process.



## Blank Space: White and Heavily Decorated Walls in the Learning Environment

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Alayna Anderson**

Honors Thesis Committee: Marleah Bouchard, Ph.D.; Linda Pickett, Ph.D.; and Bettie Parsons Barger, Ph.D.

COE – Department of Curriculum and Pedagogy

In education today, everything from the role of the teacher to the type of seating in classrooms is changing to reflect the growing body of knowledge of how students learn best. One thing that has remained unchanged in many schools is the color of the walls. In spite of research that supports colored walls, walls in classrooms are most often white. Also contradictory to research is the amount and type of decorations found on most classroom walls. The purpose of this research is to explore the relationship between the color of walls, the amount of decorations covering them, and the impact these two factors have on student learning and behavior. The available literature is reviewed and discussed in addition to the research conducted. For this research, a survey was given to teachers at a local school to be completed voluntarily and with no incentives. The survey aimed to gain insight into teachers' perceptions on the impact of the appearance of classroom walls on student learning and behavior. Results and implications of the research are discussed.

## A Historical Analysis of Soteriology and its Application among Christians

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Waverly Baker**

Honors Thesis Committee: Peter Judge, Ph.D.; William Kiblinger, Ph.D.; and Dale Hathaway, M.Div, M.A.

CAS – Department of Philosophy and Religious Studies

This thesis explores the central theological topic of soteriology: the study of the fundamental Christian understanding of salvation in and through the life, death, and resurrection of Jesus Christ. More specifically, soteriology centers on theories of what is referred to in general as "atonement" or "justification." Historically, theologians have relied on five models of justification: substitution, redemption, reconciliation, atonement, participation. The research relies first on a historical examination of how soteriology is expressed in Scripture and then on the writings of early church fathers, medieval theologians, Reformation thinkers, and modern and contemporary theologians. Primary sources, commentaries, and other secondary sources are used. The historical, theoretical research is supplemented with a qualitative survey of college-aged Christians' perceptions of their personal beliefs about how salvation is accomplished. The intention of this survey is to observe what kind of correlation exists between formal theological interpretations and the lived experience of everyday Christians.

## Spatial Tumor Growth Using Traveling Waves

*Joint Mathematics Meeting (JMM), Atlanta, Georgia, January 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: MaLyn Lawhorn**

Honors Thesis Committee: Kristen Abernathy, Ph.D.; Zachary Abernathy, Ph.D.; and Trent Kull, Ph.D.

CAS – Department of Mathematics

Cancer can be found in many forms, including clumps of cancerous cells known as tumors. Malignant tumors can be found anywhere in the body; when tumors reach the point of angiogenesis, they can grow without restraint other than blood supply, and can be modeled using a system of partial differential equations (PDE). In this paper, we consider the PDE model of McGillan, which elaborates on the model by Gatenby and Gawlinski, the first model to incorporate the acid-mediation hypothesis. The McGillan model incorporates competition between tumor cells and healthy cells into the Gatenby and Gawlinski model. We modify the McGillan model by incorporating the cancer stem cell hypothesis, introducing and modifying an equation for the cancer stem cells. We then go on to numerically solve for four solutions or tumor growth states – a homogeneous invasion state, a heterogeneous invasion state, a cure state, and a stagnant state – all of which were also derived in the McGillan model. We then explore the stability of the solutions, some of which are bistable.

## Cancer Diets and Counseling Patients with Cancer Diagnoses as a Dietitian

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Taylor Hamilton**

Honors Thesis Committee: Wanda Koszewski, Ph.D.; Lauren Sastre, Ph.D.; and Leslie Thompson, M.S.

CAS – Department of Human Nutrition

Using diets to treat and prevent cancer is becoming more and more common as cancer diagnoses continue to rise. As a result, research needs to be compiled in order to present patients with evidence-based nutrition information about these various diets and any and all outcomes of using these diets. Patients have the right to make informed decisions about all treatment options, not just information on medical interventions such as chemotherapy. This research analyzed thirteen of the most commonly utilized diets to manage cancer: the alkaline diet, the Bircher-Benner diet, the Breuss cure, the Budwig diet, fasting, the Gerson regimen, the Kelley/Gonzalez regimen, the ketogenic diet, the Livingston-Wheeler regimen, the macrobiotic diet, the Moerman diet, the raw food diet, and the vegan diet. Additionally, this research included important information on counseling patients on such diet changes. More research needs to be completed related to the topic of cancer diets, but this paper provides a review of current data and may be useful for any medical professionals working with cancer patients, such as oncologists and dietitians.

## RNAi Knockdown of the *eggless* Gene and its Effects on Fourth Chromosome Recombination Rates of *Drosophila melanogaster*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Andrew M. Williams**

Honors Thesis Committee: Kathryn Kohl, Ph.D.; Matthew Stern, Ph.D.; and Kristi Westover, Ph.D.

CAS – Department of Biology

Meiotic recombination is the natural process by which homologous chromosomes exchange pieces of information. While this process increases variation in germ cells, it is also essential for proper chromosome separation during the first meiotic division. Incorrect chromosome segregation can result in aneuploid gametes, which contain an incorrect number of chromosomes. Aneuploidy often leads to detrimental side effects, including fetal death. Despite a generous understanding of the molecular mechanisms of meiotic recombination, the forces that determine where recombination events will occur are still largely unknown. In our research, we focus on modifications to the *Drosophila* gene *eggless* to determine if heterochromatin levels affect recombination rates. *Drosophila* chromosome 4 is used for study because of its high heterochromatin content. In one experiment, heterozygotes for the mutation *egg*<sup>1473</sup> are scored for crossovers on the fourth chromosome. In another experiment, several RNAi lines are tested for *eggless* knockdown in the germarium, the tissue where meiotic recombination occurs in female *Drosophila*. The line with the most effective knockdown will be used for future crossover assays.

## Gender in Television Toy Advertising to Children

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Kathryn L. Cantrell**

Honors Thesis Committee: Sabrina Habib, Ph.D.; Padmini Patwardhan, Ph.D.; and Jennifer Solomon, Ph.D.

CAS – Department of Mass Communication

Since the 1950s, advertisements have been saturated with stereotypes. Over the years, female representation as the domestic nurturer shifted to the beautiful princess, and males from the industrial worker to the super hero. These stereotypes are perpetuated in advertisements to children through factors such as setting, interaction between characters, and the type of product. Even technical aspects, including voiceovers, camera angles, and editing reinforce these stereotypes. This review of the literature examined how toy advertisements are directed at children with a specific focus on gender representation. Consistencies were found across all studies regarding stereotypical characteristics in the advertisements. Most often girls have a more cooperative playstyle and are shown in a home setting, playing with dolls and toy animals, while boys have a more competitive playstyle and are shown in outdoor settings away from the home, playing with action figures and model vehicles. Opposition to gender stereotypes is also discussed.

## Impact of Multimodal Instruction on Phonemic Awareness in Kindergarten

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Catherine Metts**

Honors Thesis Committee: Crystal Glover, Ph.D.; Bettie Parsons Barger, Ph.D.; and Tenisha Powell, Ph.D.

COE – Department of Curriculum and Pedagogy

Phonemic awareness is the ability to recognize and accurately pronounce small segments of words. Phonemic awareness forms the building block for future reading performance. While most children develop phonemic awareness during early language play, such as nursery rhymes and songs, some children do not develop the skill and have low academic performance as a result. The purpose of the study was to investigate the effects of a multimodal instructional intervention strategy on participants' ability to recognize beginning consonant letters and letter sounds. Multi modal sound instruction took place for one hour twice a week for six weeks. At the end of the intervention, the participants were re-assessed using the beginning consonant letter sound screening to see the impact of the intervention. Findings revealed that all participants improved in their recognition of letter and letter sounds.

## Fad Diets and Nutrient Intake

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Amber Kesterson**

Honors Thesis Committee: Wanda Koszewski, Ph.D.; Clifton Harris, Ph.D.; and Simone Camel, Ph.D.

CAS – Department of Human Nutrition

As of September 2015, obesity rates hit an all-time high in the United States, with more than a third of Americans considered obese. Excess body fat increases an individual's risk of a slew of chronic illnesses, such as diabetes, hypertension, cardiovascular disease, osteoarthritis, and some cancers. As a result, obesity has become one of the greatest contributors to healthcare costs in the United States. As public awareness of the obesity epidemic has increased, so has the occurrence of fad diets, all claiming to be the new fix for obesity and the key to optimal health. These diets can be grouped into food-group-excluding diets, macronutrient-excluding diets, and overall energy-restricting diets. This study compiles research on the most popular diets fitting into these categories and analyzes how closely they follow the dietary reference intakes (DRIs), potential consequences of following these diets, and the likelihood of success on these diets. Most of these diets can attribute any of their successes to overall caloric restriction rather than the specific restrictions of the diet. Several of the restrictions that are touted by various fad diets can actually be quite detrimental to health. The diets excluding macronutrients or food groups leave dieters at great risk for developing nutrient deficiencies. Nutrient deficiencies can lead to issues with growth and development, and impair normal functioning of the body's systems. The diets that restricted overall intake while sticking closely to the DRIs had the most success, with dieters ultimately losing weight.

## The Relationship between Upper Body Injuries and Lower Body Flexibility in Athletes: A Comprehensive Review

*McNair TRiO Research Symposium, Columbia, South Carolina, June 2016; 22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Holly Rittenberry, McNair Scholar**

Honors Thesis Committee: Joni Boyd, Ph.D.; Alice McLaine, Ph.D.; and Seth Faulkner, A.T.C

COE – Department of Physical Education, Sport, and Human Performance

Baseball players, specifically pitchers, are susceptible to ulnar collateral ligament (UCL) injuries because of the stress placed on the elbow joint during the throwing motion. Additionally, because the body is a kinetic chain, lower body flexibility has shown to impact upper extremity flexibility. This comprehensive literature review examines numerous articles about the anatomical structure of the UCL, lower body flexibility, and the methods used to determine flexibility, including goniometry, the sit-and-reach test, and functional movement screening. The purpose of this literature review is to identify a connection between lower body flexibility and the ulnar collateral ligament.

## The Effects of Technology on Low-Literate Learners

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Phyllis Economy**

Honors Thesis Committee: Bettie Parsons Barger, Ph.D.; Kavin Ming, Ed.D.; and Kimarie Whetstone, Ph.D.

COE – Department of Curriculum and Pedagogy

The purpose of this study is to examine the effects of the use of technology on the literacy development, specifically the engagement, motivation, and comprehension skills of low-literate learners. Literacy has always been the focus, but now technology is the new, exciting innovation in everyone's daily life and it has implications in the educational setting. The use of this fresh technology is mandated in many schools. Therefore, teachers must ask themselves, "Is technology as beneficial as the idea of it is?" This study sets out to explore this question through the use of guided reading groups and one-to-one implementation of technology. Involving a review of literature that highlights the opportunities that students are offered for integrating technology and literacy in the classroom, this paper details the weekly literacy and technology interventions with a small reading group. This paper will also analyze the progression of student achievement throughout the weekly intervention during field-based research. The findings show increases in engagement, motivation, and comprehension skills among the third-grade participants.

## A Lower Bound on the Hadwiger Number of a Random Subgraph of the Kneser Graph

*Regional Mathematics and Statistics Conference, University of North Carolina, Greensboro, November 2016; Joint Mathematics Meeting (JMM), Atlanta, Georgia, January 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Kristen Melton**

Honors Thesis Committee: Arran Hamm, Ph.D.; Kristen Abernathy, Ph.D.; and Thomas Polaski, Ph.D.

CAS – Department of Mathematics

For  $n, k$  in the natural numbers, let  $G = KG(n, k)$  be the usual Kneser graph (whose vertices are  $k$ -sets of  $\{1, 2, \dots, n\}$  with  $A \sim B$  if and only if  $A \cap B = \emptyset$ ). The Hadwiger number of a graph  $H$ , denoted  $h(H)$ , is  $\max\{t : K_t \text{ is a minor of } H\}$ . In "Lower Bound of the Hadwiger Number of Graphs by their Average Degree," Kostochka gives a lower bound on  $t$  with respect to the average degree of a graph  $H$ . Now, let  $G_p$  be the usual binomial random subgraph of  $G$ . In this paper, we give a general lower bound on  $h(G_p)$  as  $n \rightarrow \infty$  with  $k \ll \sqrt{n}$ ; indeed, if  $k$  and  $p$  satisfy certain conditions, our lower bound is larger than previous lower bounds.

# PUBLIC PRESENTATIONS AND PERFORMANCES

## Promoting a President: Evaluating the Evolution of IMC Strategy in Political Marketing

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Eva Owusu**

Faculty Mentor: Sabrina Habib, Ph.D.

CAS – Department of Mass Communication

Every four years in the United States there is a race between candidates to become president. Each candidate has an organized team responsible for utilizing the campaign resources and developing a strategy in order ensure success. Throughout the years, the way each campaign has approached promoting their candidate has evolved. This review of literature analyzes the evolution of integrated marketing communication strategy in political marketing. Its goal is to gain an understanding of how advertising and promotion strategy has evolved in politics and where it could possibly be heading. The review includes a detailed overview of the evolution of the concept of integrated marketing communications along with the historical changes in political campaign communications.

## Frescos, Females, and Freedom

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Jennifer J. Oliver**

Faculty Mentor: Laura Dufresne, Ph.D.

CVPA – Department of Fine Arts

(ARTH344 – Dufresne)

Outside Florence, Italy, circa 1451, Andrea di Nicolo hired a fiery, young artist, Andrea del Castagno, to paint inspirational frescoes in his newly acquired villa. Castagno's larger-than-life figures included accomplished men and women from the distant to fairly recent past, designed to inspire viewers to engage in meaningful work and civic duty, and promoting equality for all, regardless of gender. Fusing classical Greek Humanism with a new twist of thought regarding Christianity's Eve, the frescoes commended the secular achievements of both males and females, while attributing spirituality to their accomplishments. The recognition of both sexes was unusual, even in the Neoplatonic intellectual community active in Florence at the time. The inclusion of historic, valiant females alongside accomplished modern males has schol-

ars and admirers deciphering the message of the frescoes to this day. This fresco cycle gives insight into a small window of time wherein women were considered, by a few intellectuals, to be equal and worthy, not simple, childbearing wenches and sources of the world's evil. Although Castagno's work in the villa de Carducci is monumental in form and subject, I argue that the *meaning* of the fresco cycle, while debatable and multifaceted, is both new and epic because of the intellectual reasoning behind it. Known for liveliness, movement, linearity, and his use of color to charge his work with an expressive atmosphere, Castagno was the perfect artist to bring this weighty and inspirational subject to life. It is not merely a history lesson, however, as the fresco indicates the secular was on par with or a manifestation of the spiritual. Eve, in particular, has a muscular form full of vitality and strength, in stark contrast to the medieval view as the origin of evil. She is neither sexualized nor marginalized, but portrayed as a provider, protector, and diligent worker. Her inscription below elevates her with a respectful tribute to her motherhood of humanity, which is in further contrast to the Church's reverence for Mary, Mother of Christ. It would be hundreds of years before the equality of women would be discussed and accepted. Thus, the fresco frames spirituality alongside the secular, along with the Classical Greek ideals of liberty. This may be seen as a humanistic belief in salvation and immortality via one's work, if the work proves itself monumental by benefiting and liberating others.

## Novel Mycobacteriophages Discovered in the Soil at Winthrop University and Local Ecosystem

*American Society for Microbiology, South Carolina Branch Meeting, Florence, South Carolina, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grant from the Howard Hughes Medical Institute for the SEA-PHAGES Program*

**Students: Autumn S. Brewer, Shelbie A. Broach, Sierra T. Davis, Sara P. Dixon, Heather C. Green, Melody C. Iacino, Emily A. Katsos, David Nate Knight, Hallie V. Smith, Madison A. Workman, and Adam C. Zeitz**

Faculty Mentors: Kristi Westover, Ph.D., and Victoria Frost, Ph.D.

CAS – Department of Biology

(BIOL 203R – Frost, Westover)

The SEA-PHAGES (Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science) program is an inquiry-based research course developed by the Howard Hughes Medical Institute's Science Education Alliance. This nationally sponsored research aims to introduce undergraduate students to genuine hands-on research in their first year of higher education. During the fall semester, freshmen students at Winthrop University isolated eleven unique viruses that infect bacterial strain *Mycobacterium smegmatis* mc2 155, through enrichment of soil samples collected from the grounds of Winthrop University and surrounding areas. Each phage was amplified in the *M. smeg* bacterial host and then characterized, following DNA extraction using gel electrophoresis. Electron microscopy demonstrated that all eleven phages had long flexible tails and belong to the *Siphoviridae* group of mycobacteriophages. This study represents the first look at the diversity of the mycobacteriophage population in the Rock Hill area of South Carolina, and helps to expand the collection of phages characterized across the United States.

## Decellularization and Recellularization of Porcine Acellular Muscle Matrix Scaffolds

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE) and Winthrop University Research Council*

**Student: Carolina T. Pham**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Traumatic injuries often result in significant damage to skeletal muscle tissue. Current methods for repairing damaged skeletal muscle are inadequate and associated with donor site morbidity, as they require a patient's healthy tissue to be harvested in attempts to repair or replace damaged tissue. A variety of biomaterials that facilitate muscle regeneration/repair are in development; however, few are able to provide the structural and biochemical cues present in the tissue's native scaffolding, its extracellular matrix. Here, we describe the production and initial characterization of a biomaterial we refer to as Porcine Acellular Muscle Matrix (PAMM), which is produced through the decellularization of sheets of porcine skeletal muscle. We also demonstrate that PAMM scaffolds can be efficiently recellularized with murine C<sub>2</sub>C<sub>12</sub> myoblasts. This work sets the stage for us to 1) use PAMM scaffolds to test the myogenic potential of different stem cell populations in a three-dimensional *in vitro* culture system and 2) test the ability of unseeded or cell-seeded PAMM scaffolds to support skeletal muscle regeneration *in vivo*.

## Collector's and Access-Based Consumption: A Sneakerhead's Perspective

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Naseem A. Adkinson-Jobe, McNair Scholar**

Faculty Mentor: Stephanie Lawson, Ph.D.

CBA – Department of Management and Marketing

This research focuses on what persuades sneakerheads to partake in access-based consumption. This research is important, because the relationship between collectors, particularly sneakerheads, and access-based consumption has not yet been explored. This topic was studied by conducting semi-structured interviews with sneakerheads, to find themes and correlations that depict motives for consumers to participate in access-based consumption. The findings will contribute something new to the literature based upon access-based consumption, because currently there is no literature that depicts what motivates or discourages collectors/sneakerheads to become access-based consumers.

## The Relationship of Lower Body Flexibility and Stress on the Ulnar Collateral Ligament in High School Baseball Pitchers

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Holly Rittenberry, McNair Scholar**

Faculty Mentors: Joni Boyd, Ph.D., and Seth Faulkner, A.T.C

COE – Department of Physical Education, Sport, and Human Performance

Baseball players, specifically pitchers, are susceptible to ulnar collateral ligament (UCL) injuries, because of the stress placed on the elbow joint during the throwing motion. Flexibility is a crucial aspect when throwing a baseball. There is a need to better understand how flexibility of the lower body can affect the throwing motion of a pitcher, specifically the UCL stress. By better understanding the relationship between flexibility and UCL stress, pitchers may be able to incorporate skills that will reduce the potential for injury. The purpose of this study was to examine the relationship between lower body flexibility and UCL stress in high-school baseball pitchers. Data were collected from 10 players participating in local high-school or traveling baseball teams during spring, summer, and fall of 2016. Ages ranged from 15-18, with an average age of 16 years. For each pitcher, bilateral goniometry measurements of the lower body and sit-and-reach scores were used to assess flexibility, and the Motus Baseball Sleeve was used to measure UCL stress of 10 fastball pitches. Data collection is still in progress.

## A Comparison of Ethical Theories

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Matthew Tyler Newton**

Faculty Mentor: Peter Judge, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 495 – Judge)

The primary focus of this paper is to analyze and compare the varying ethical ideas and theories of Immanuel Kant, Epictetus, Nicolo Machiavelli, and Jeremy Bentham. However, in order to fully satisfy this intent a secondary concern must first be addressed. A common misconception among most groups of people is the view that morality and moral principles are the same as or interchangeable with ethics and ethical principles. This paper sets out to establish a scenario in which the difference between ethics and morality can more clearly be seen; from there, it will seek to establish and summarize Kant's ethical stance as a means for comparison, assert the difference between ethical and moral behavior, and then move on to its main focus: I will analyze of the ethical theories of Epictetus, Machiavelli, and Bentham, and attempt to solve the ethical dilemma presented in the introduction from the perspectives offered by their respective theories. After this analysis, I will summarize the main points of each section, and I briefly offer my own opinions of the ethical ideas discussed.



## Millennial Dating Applications

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Henley Castleman, Alli Steinke, Kelsey Mikeska, Christine Shannon, and Markayela Johnson**

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – Patwardhan)

This study examines online dating among millennials- more specifically the use of Tinder, Bumble, and Hot or Not. It will build on prior research published about millennials and their usage of technology and how they use technology to find romantic relationships. Using survey methodology, we will investigate why millennials use these apps, how satisfied they are with them, how often they use them, and what other dating sites they use. Through our research, we hope to find out reasons why dating apps are popular among millennials and what concerns, if any, they have about using them.

## Bridge-Enhanced ACL Repair (BEAR) Surgery and the Correlated Effects on Rehabilitation Time

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Cody Porter**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

The primary goal of this study is to research a new anterior cruciate ligament (ACL) surgery method and compare it to the standard surgical method, ACL reconstruction surgery. The new method is Bridge-Enhanced ACL Repair surgery also known as the BEAR procedure. The ACL is unlike most other ligaments of our knee, because it lacks the ability to repair itself if torn. Because of this, the common surgical practice for many years has been ACL Reconstruction surgery. In this type of surgery, a surgeon will take a skin graft from another part of the patient's body, primarily the hamstring, and use the graft to attach the two ends of the ACL back together. Due to this, patients who undergo ACL reconstruction surgery have an increased risk of developing osteoarthritis. With the BEAR procedure, a surgeon can go in and place a bridge scaffold (a sponge) containing specialized proteins between the two torn sections of the ligament. After this, the surgeon then ties sutures to both ends of the ligament and pulls the two ends into the sponge, then injecting the sponge with the patient's own blood. This creates an environment for clotting inside the sponge, enabling the two torn ends of the ligament to grow back together and repair themselves. Early studies show that this new surgical method can reduce the rehabilitation time for an individual who has suffered an ACL tear and decrease his or her risk of developing osteoarthritis.

## Epigenetic Modifiers 5-Azacytidine and Trichostatin A Alter Adipose-Derived Stem Cell Gene Expression

*South Carolina INBRE symposium, Columbia, South Carolina, August 2016; South Carolina Academy of Science Annual Meeting, Coastal Carolina University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Melissa Barr**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Adipose derived stem cells (ADSCs) are multipotent, mesenchymal stem cells that are found within the microvasculature of adipose tissue. While ADSCs have the potential to differentiate into multiple cell lineages, they cannot match the differentiation potential of pluripotent stem cells. ADSCs can be epigenetically manipulated in order to increase their developmental potency. An enhanced state of ADSC developmental potency could be particularly beneficial in efforts to drive the cells into specific lineages, like skeletal muscle, that are not among those most readily produced by ADSCs. If successful, such a method could provide an easily accessible source of autologous myogenic cells for skeletal muscle regeneration and tissue engineering. We hypothesized that exposure to the histone deacetylase inhibitor trichostatin A, and prevention of DNA methylation by 5-azacytidine, would alter the epigenome of ADSCs in a way that enhances developmental potency and enables more efficient myogenic differentiation. Our results suggest that the epigenetic modifiers did indeed alter gene expression in ADSCs. We observed changes in the expression of genes associated with enhanced differentiation potential, as well as genes associated with the myogenic lineage. In the future, we would like to optimize the combination of epigenetic modifiers, in order to generate ADSCs with the most myogenic potential. We will then combine those cells with a porcine acellular muscle matrix scaffold to study the potential of ADSCs to be used in skeletal muscle tissue engineering and regenerative medicine.

## Outcomes of an Inclusive Book Club: Lessons Learned and Practical Application for K-12 Teachers

*Eighth Annual Partnership Conference for Educational Renewal, Winthrop University, June 2017*

**Student: Lauren Smith**

Faculty Mentors: Shawwna Helf, Ph.D., and Debra Leach, Ed.D.

COE – Department of Curriculum and Pedagogy

We examined undergraduate students' perceptions of peers with intellectual and developmental disabilities before and after a book study project. Over a six-week period, undergraduate students (Winthrop teacher education majors) and Winthrop Think College (WTC) students engaged in a book club, reading/discussing a piece of literature. We analyzed the impact the project had on students with and without disabilities and offer considerations for how projects such as these can be initiated in K-12 schools to promote inclusive practices for all learners.

## Effects of Diphenhydramine and Triclosan on Aquatic Biofilm Communities in Lake Wylie, South Carolina

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Students: Sarah M. Walter and Megan E. Smith**

Faculty Mentor: Cynthia Tant, Ph.D.

CAS – Department of Biology

Humans use a variety of compounds each day in products for personal health and hygiene, and these compounds can find their way into freshwater ecosystems through a variety of pathways. Although some research has been done to assess the effects of various compounds on individual species, ecologists still know very little about how they can affect aquatic assemblages and ecosystem function. We measured the effects of a commonly used pharmaceutical (diphenhydramine) as well as an antibacterial ingredient used in many personal care products (triclosan) on autotrophic and heterotrophic activity of aquatic biofilms in Lake Wylie, South Carolina. We measured gross primary production (GPP) and respiration (R) using pharmaceutical diffusing substrates that contained high and low concentrations of either diphenhydramine or triclosan. Due to high variability within treatments, there were no significant differences in gross primary production or respiration between treated and control samples for either compound. Several factors may have contributed to the lack of a treatment effect, including unexpectedly high prevalence of heterotrophic species living within the biofilms, low diffusion rates of the compounds, and decreased activity due to stress. Water samples were also taken for nutrient analysis, which suggested enrichment in Lake Wylie. Understanding how these commonly used compounds can affect ecosystem function and how they may interact with other stressors can help inform management of aquatic resources and design of wastewater treatment plants in the future.

## “I Was Blown up While We Were Eating Cheese”: Deconstructing the Hero in *A Farewell to Arms*

*South Atlantic Modern Language Association (SAML), Jacksonville, Florida, November 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Hannah Jackson**

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 300 – Bickford)

In their analyses of Ernest Hemingway's *A Farewell to Arms*, many critics consider Henry a victim of war and an honorable soldier, but few recognize that Henry is not a brave war hero. In this paper, I utilize a deconstructionist view to deconstruct key scenes that reinforce the hero/anti-hero binary opposition and more accurately depict Henry as an anti-hero. Henry's anti-heroism is first illustrated in the nature

of his wound and the value soldiers place on medals. Regardless of being severely wounded due to an indifference to danger and a preoccupation with eating, Henry is still rewarded with medals, which signify him as an honorable hero. Through slippage between the signifier and the signified, though, the medals' illegitimacy identifies him as an anti-hero. Through Henry's murder of the soldier, there is additional slippage between the signifier and the signified of the word *honor* as Henry's actions are dishonorable. Furthermore, in Henry's abandonment of the war, *différance* is exhibited in both the sharp contrast drawn between Henry's and the officer's values and in Henry's postponement of death. Additionally, not only does Henry's abandonment demonstrate his self-preservation, but he also fails to see that his situation has been flipped with the soldier he killed. Lastly, there is further slippage between the signifier and the signified of the word *bravery* as Henry identifies himself as one of the broken and non-brave and Catherine as one of the brave. Consequently, Henry confirms himself to be an anti-hero, while Catherine becomes the hero.

## Cloning of Novel Variants of HMGA1a to Understand the Role of Arginine Residues in DNA Binding

*Summer Undergraduate Research Experience (SURE) Symposium and Poster Session, Winthrop University, June and September 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE), with prior support from a National Science Foundation Research Initiation Grant and an NIH Academic Research Enhancement Award*

**Student: Maryssa Shanteau-Jackson**

Faculty Mentor: Takita Sumter, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Cancer initiation and progression occurs through a series of key molecular steps that lead to aberrations in tumor suppressor, oncoprotein, and signaling functions within the cell. While a number of pathways have been implicated in cancer progression, many mechanistic studies of genes altered as an adenoma progresses to a carcinoma result in upregulation of *high mobility group A1 (hmga1)*. Mice bearing the *hmga1* transgene develop aggressive lymphoid malignancies, and *hmga1* overexpression leads to increased drug resistance and self-renewal capacity in a variety of cancers. The gene encodes three products as a result of alternative splicing – HMGA1a, HMGA1b, and HMGA1c – all of which preferentially bind DNA sequences rich in adenine (A) and thymine (T). While the specific function of these regions is not clearly understood, both DNA-protein and protein-protein interactions depend on the presence of three Arg-Gly-Arg (RGR) motifs. To elucidate the role of highly conserved arginine residues in HMGA1 function, we created single and double mutants of arginines in the first RGR motifs. Because the conversion of Arg at position 25 to alanine (R25A) and lysine (R25K) dramatically decreased DNA binding *in vitro*, we engineered mutations encoding both single arginine to glutamate (R25E) mutations and double mutations of arginine to glutamate and alanine (R25E27A). Mutations were generated using Quik-change mutagenesis approaches; specific conditions for gene amplification were optimized and verified by automated sequencing. From this, we hope to gain insights into the molecular networks involved in cancer initiation and progression.

## Porcine Acellular Muscle Matrix Scaffolds Support Recellularization by Myogenic Cells

*South Carolina INBRE symposium, Columbia, South Carolina, August 2016; South Carolina Academy of Science Annual Meeting, Coastal Carolina University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Natalie Mseis**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Skeletal muscle has a remarkable, yet limited capacity for regeneration. Severely damaged skeletal muscle is incapable of full regeneration, leaving patients with few suitable options for restoring lost muscle mass and/or function. Tissue engineering and regenerative medicine offer a potential solution for individuals with severely damaged muscle. Two components required for successful skeletal muscle tissue engineering/regenerative medicine are a source of myogenic cells and a biomaterial capable of stimulating myogenesis *in vivo* and *in vitro*. In our lab, we are producing a biomaterial from decellularized porcine muscle, which we refer to as Porcine Acellular Muscle Matrix (PAMM). Our goal is to recellularize PAMM scaffolds with C<sub>2</sub>C<sub>12</sub> myoblasts. We hypothesize that PAMM scaffolds have the ability to promote recellularization and complete myogenic differentiation by C<sub>2</sub>C<sub>12</sub> myoblasts and other sources of myogenic cells. Our results indicate that decellularization of porcine muscle can be achieved via two different protocols: 1) a detergent-based method and 2) a method based on actin depolymerization and hypertonic/hypotonic shock. Additionally, we establish that PAMM scaffolds can support the infiltration and growth of C<sub>2</sub>C<sub>12</sub> myoblasts. We are currently exploring the potential of adipose-derived stem cells (ADSCs) to contribute to myogenic differentiation within PAMM scaffolds, following exposure to culture conditions that are believed to enhance their myogenic potential.

## Culturing Murine Adipose-Derived Stem Cells as Spheroids in 5-Azacytidine and Trichostatin A Alters Gene Expression

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Elizabeth McAbee**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Stem cells are undifferentiated cells that have the capability to differentiate into one or more cell lineages. Adipose-derived stem cells (ADSCs) are multipotent, mesenchymal stem cells that are located within the microvasculature of adipose tissue. Although multipotent ADSCs can differentiate into several cell lineages,

they cannot match the differentiation potential of pluripotent stem cells, such as ES and iPS cells. However, previous research in our lab shows that culturing murine ADSCs as three-dimensional spheroids can induce the expression of genes associated with pluripotency. We hypothesized that the combination of culturing ADSCs as three-dimensional spheroids and treatment with compounds that manipulate the epigenome can 1) upregulate the expression of several genes associated with enhanced potency and 2) improve the efficiency of myogenic differentiation by ADSCs. Our results support our hypothesis that culturing ADSCs as spheroids in combination with treatment with trichostatin A, a histone deacetylase inhibitor, and 5-azacytidine, an inhibitor of DNA methylation, all impact the expression of genes associated with ADSCs' potency and/or myogenic potential. Future work includes identifying the combination of culture conditions that most efficiently enhances the myogenic potential of ADSCs. This can be tested by recellularizing porcine acellular muscle matrix scaffolds with these enhanced ADSCs in order to assess their myogenic potential. Maximizing the myogenic potential of ADSCs would allow ADSCs to serve as a plentiful source of myogenic cells for skeletal muscle tissue engineering and regenerative medicine applications.

## #RIP: Maintaining Bonds with the Deceased on Facebook

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: DesiRee Johnson and Brittany Davis**

Faculty Mentor: Lisa Moyer, Ph.D.

COE – Department of Counseling, Leadership, and Educational Studies

All humans will experience the loss of loved ones and accompanying grief. Though grief is natural and expected, it is a highly individualized process. "Effective grieving" is better enabled when people are able to accept the grief. Klass (2006) proposed that learning to live with intense sorrow following a loved one's death may be a preferred model for coping with grief, instead of the prescriptions for "closure" that were once pervasive. In fact, as Pennington (2013) suggests, "rather than severing all ties, the bereaved [should] find ways to renegotiate and understand their relationship with the deceased." Although thanatechnology studies initially researched the promise of home videos and computer-assisted instruction programs to help survivors process grief, this area of research has flourished with the growth of online connectivity. Social media platforms are uniquely equipped to afford users a metaphorical place to address the dead and share their feelings and experiences. However, there is little compelling empirical evidence to demonstrate that having a relationship with the deceased is a functional form of grieving. The current study examined how Facebook users managed their grief through social media, and how their use of Facebook affected the grieving process. The study used a mixed-methods research design with a non-randomized convenience sample of 162 individuals, 88% females, of average age 38.52 years (SD = 9.90). Results revealed that most participants found it helpful to communicate about their individualized grief on Facebook, by remembering and honoring special events, expressing emotions, and forming connections with others who knew the deceased and the deceased's friends and family. These findings are beneficial for educators, counselors, healthcare personnel, and others who work directly with individuals and families. Understanding how Facebook can help individuals and communities to find meaning in a loved one's death can assist professionals and paraprofessionals in treating and supporting those who are grieving.

## The Cult of Mary: A History of the Virgin's Origins to Modern Day Devotion

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Adriana McMurphy**

Faculty Mentors: Peter Judge, Ph.D., and Laura Dufresne, Ph.D.

CAS – Department of Philosophy and Religious Studies and CVPA – Department of Fine Arts

(RELG 495 – Judge)

This paper researches the history of Mary the mother of Jesus and the various cults that have developed around her in different parts of the world. The paper is a historical and anthropological piece, with sections presented in chronological order. It begins with the New Testament scriptures (Gospels, Revelation), Apocryphal gospels, and early Christian debates about Mary's role (i.e., the Councils of Nicaea & Ephesus). It then goes on to discuss Mary in the Quran and then the biblical Old Testament, with prefiguring female characters to Mary discussed. There are also cross-cultural, historical discussions about Mary and other religious mother goddess figures, as well as how Mary herself fits into the "goddess mindset." More historical sections discuss Mary's various roles in the Middle Ages and Renaissance and the later decline of devotion to her during the Reformation. Moving on to more modern times, the sections then cover various Marian apparitions and how Mary has become synced with other goddess figures outside of Christianity. The research concludes with a discussion of modern-day, Middle-Eastern Christians and Muslims interacting and worshiping together, drawn together by the common figure they share: Mary.

## Death, The Incompetent Timekeeper: Examining the Views Surrounding Death within Religious and Secular Existentialism

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Abram Mbeya**

Faculty Mentor: Peter Judge, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 495 – Judge)

This paper examines views concerning the nature and role of death within existentialism. Drawing from authors such as Kaufmann, Heidegger and Kierkegaard, among others, the paper delves into the history and dialogue surrounding death. The paper also focuses on the secular and religious viewpoints, more specifically those shared by Christian existentialists, in order to better understand the nature and role of death within the existential philosophy. Given the problem that it poses to both (the religious and the secular), Death's role is likened to that of an incompetent timekeeper, shifting the focus towards how both the secular and religious existentialists achieve authenticity in spite of its influence. The answer is found in examining both the epicurean and the platonic views of the soul, the former being more secular in nature than the latter. The paper presents the viewpoint that timeliness created by death is the ultimate decider of human authenticity.

## Evaluation of Zone-4 Inhibitors Using Sphingosine Kinase Activity Assay

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDEa Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Mikala R. Smith**

Faculty Mentor: Christian Grattan, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552 – Hanna)

Sphingosine kinase 1 is an enzyme that catalyzes the phosphorylation of sphingosine to form sphingosine-1-phosphate, which is known to induce cell proliferation. Research indicates that there is an overexpression of sphingosine kinase 1 in cancer cells that leads to accelerated cell growth of cancer cells. An inhibitor, Sphingosine kinase Inhibitor 1 (SKI-1) has been found to inhibit sphingosine kinase 1 *in vitro*, while failing to be effective *in vivo*. Modifications to the structure of the inhibitor yielded derivatives that may or may not exhibit inhibitory effect *in vivo*. Using a Sphingosine Kinase Activity Assay kit, fifteen derivatives were synthesized and tested. Two derivatives, 4A and 4B, were found to have some inhibitory effect, with luminescence values of 38,617 and 32,776, respectively. These values are higher than the average luminescence value of 13,328 that corresponds to a reaction without any inhibitor.

## Thomas Aquinas and the Resurrected Body

*National Conference on Undergraduate Research (NCUR), University of Memphis, April 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Victoria Burdette**

Faculty Mentor: Peter Judge, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 316 – Judge)

There is no doubt that the philosophical work of Plato and his student, Aristotle, are a significant starting point for practically all subsequent philosophers and even theologians. In this paper, I put forth the argument that St. Thomas Aquinas in particular draws on the philosophies of Plato and Aristotle in his explanation of the relationship between the body and the soul and what that relationship implies for bodily resurrection. In order to understand Aquinas' ideas on the human soul and body, I first examine how the ideas of Plato and Aristotle influenced Christian thought contemporary to Aquinas including an exploration of how consistent those ideas are with biblical teaching. Such an exploration sets the stage for Aquinas' beliefs on the matter as he draws on these philosophers—especially Aristotle—but in a way that aligns well with scripture that, therefore, made his teachings more concordant with and accepted into Christian thought than Aristotle's. After examining Aquinas' insight on the physical and spiritual aspects on life, we might see the connection between his explanation about the afterlife and the Christian hope of bodily resurrection and the completeness of life accomplished by a spiritual body united with the soul.



## Isolation, Purification, and Characterization of Soil Bacteriophages Asriel and Haimas

*American Society for Microbiology, South Carolina Branch Meeting, Florence, South Carolina, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grant from the Howard Hughes Medical Institute for the SEA-PHAGES Program*

**Students: Autumn S. Brewer, Shelbie A. Broach, Sierra T. Davis, Sara P. Dixon, Melody C. Iacino, Emily A. Katsos, David Nate Knight, Hallie V. Smith, Madison A. Workman, and Adam C. Zeitz**

Faculty Mentors: Victoria Frost, Ph.D., and Kristi Westover, Ph.D.

CAS – Department of Biology

(BIOL 271 – Westover and BIOL 203R – Frost)

The goal of this study was to isolate, purify, and characterize bacteriophages found in soil near Rock Hill, South Carolina, near Winthrop University. In conjunction with the HHMI Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) Program, this research expands our understanding of the genomic diversity of bacteriophages in this region. Two novel bacteriophages, Asriel and Haimas, were isolated from the soil and characterized. Samples were enriched using *Mycobacterium smegmatis* and purified until uniform plaques were isolated. High titer lysates were prepared from pure culture and DNA was isolated for analysis for restriction enzyme digests. DNA was sequenced at Pittsburg State University (PSU), followed by annotation using DNA Master Software. Asriel is 74,594 base pairs in length, has approximately 142 genes, and is a member of Cluster E. Haimas is 68,296 base pairs in length, has approximately 100 genes, and is a member of Cluster B1.

## Fire Events and Soil Thermometry: The Applications of Clay Chemistry for Tracing Temperature Changes in Soils and Sediments Below Surface Fires

*American Geophysical Union Fall Meeting, San Francisco, California, December 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the Winthrop University Research Council*

**Student: Emily Watson**

Faculty Mentors: Scott Werts, Ph.D., and Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Fires in the natural environment affect the physical, chemical, and biological properties of soils. However, fires may also alter the mineralogy of the geologic material with which it comes in contact. Previous experiments on high-temperature alteration of clays indicate that dehydration, oxidation, and hydroxylation in clay minerals can occur progressively, in that order, at increasing temperatures up to 500°C. It is also well known that wildfire events can allow soils several centimeters

deep to reach these temperature ranges. In this experiment, alterations in clay chemistry were used as a tool to investigate fire intensity, along with the changing morphology of clay minerals. For data collection, small camp fires were set in York County, South Carolina, and temperatures were recorded using a datalogger system to 5 cm deep during the fire event. Control samples were taken adjacent to the fires to compare the changing morphology of the minerals when heated. Powder X-ray diffraction and scanning electron microscopy were used to identify the clay mineralogy. The clays from soil samples were identified as hydrous kaolinite, anhydrous kaolinite, and varying types of goethite. To observe the dehydration, oxidation, and hydroxylation of clay minerals, scanning electron microscopy with emission dispersive spectroscopy was used to identify the O/cation ratios present, which would indicate changes in the oxidation state of the clay minerals. By mapping the changes in O/cation ratios with temperature in silicates, we are able to trace the temperature of the sediments during fire events. This research suggests it may be possible to utilize these geochemical trends to aid in soil and sediment temperature investigations, in both archaeological and modern soil and surface process investigations.

## Examining the Diversity and Origin of Bacteria on South Carolina Oceanic Beaches

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDEA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Students: Douglas Johnson and Cameron Sellers**

Faculty Mentors: Victoria Frost, Ph.D., and Matthew Heard, Ph.D.

CAS – Department of Biology

Oceanic beaches are dynamic ecosystems that are home to many different types of microbial species. While most of these bacterial species are not pathogenic to humans, there are some that are of public health concern. As such, these environments are monitored for microbes that may cause disease and illness. The one problem with this approach is that it is difficult to identify and track all species. Therefore, monitoring agencies usually focus on either common pathogens or bacteria that are associated with fecal pollution (Fecal Indicator Bacteria; FIBs). In this study, we assessed bacteria levels for one common pathogen (*Staphylococcus aureus*) as well as two common FIBs (*Escherichia coli* and *Enterococcus spp.*) on three oceanic beaches in South Carolina. These beaches were selected for study because recent research in this area has shown that FIBs may be more commonly found in beach sand than previously thought. In addition, and to help better understand where these bacteria are coming from on these beaches, we also used the molecular technique of phylo-grouping to identify potential sources of *Escherichia coli*. Using this approach, we determined that all three microbial taxa we looked for were present at all study sites, but that there was no significant difference for their distribution patterns. Additionally, we found that likely sources of *Escherichia coli* included humans, wild animals, and domesticated animals. Collectively, these findings indicate that pathogens and FIBs may commonly persist on oceanic beaches, but more work is needed to determine if this is of public health concern.

## Evaluation of Biphenyltetrols as Aggregation Inhibitors for Alzheimer's Amyloid- $\beta$ Peptide

*68th Southeastern Regional Meeting of the American Chemical Society, Columbia, South Carolina, October 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Students: Matthew J. Hurtt and William J. Schreiber**

Faculty Mentors: Robin K. Lammi, Ph.D., and James M. Hanna Jr., Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Amyloid- $\beta$  peptide (A $\beta$ ) self-assembles into neurotoxic,  $\beta$ -structured aggregates, which are the primary component of the extracellular senile plaques characteristic of Alzheimer's disease. A variety of small molecules have been shown to inhibit the aggregation process; typically, these contain aromatic groups and one or more hydrogen-bond donors to enable binding to A $\beta$ . We have previously identified biphenyltetrols (BPTs) as a class of molecules exhibiting promising inhibitory efficacy. 3,3',4,4'-tetrahydroxybiphenyl (3,4-BPT) was the most promising, reducing equilibrium aggregation by 50% when present in stoichiometric concentrations (i.e., IC<sub>50</sub> = 1X); 2,5- and 2,3-BPT were also effective, albeit less so. Other symmetrical BPTs (e.g., 2,4-BPT, 2,6-BPT, 3,5-BPT) failed to exhibit significant inhibition. Based on these results, we hypothesized that "hybrid" unsymmetrical biphenyltetrols combining the most promising arrangements of hydroxyl groups may also be successful inhibitors. 2,3',4',5-BPT, 2,3,3',4'-BPT, and 2,2',3,5'-BPT were therefore synthesized and evaluated for inhibitory efficacy using the Congo red (CR) spectral-shift assay, which exploits CR's specific binding to  $\beta$ -structured aggregates to enable monitoring of A $\beta$  aggregation as a function of time. Our results indicate that neither 2,3,3',4'-BPT nor 2,2',3,5'-BPT are effective inhibitors; however 2,3',4',5-BPT appears to be a promising inhibitor of A $\beta$  aggregation (IC<sub>50</sub> = 1.8X).

## Identifying Needs to Support Elders of the Catawba Indian Nation

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the Winthrop University Research Council*

**Students: Jhane' Nicole Kirkland and M. Bianca Prescott**

Faculty Mentors: Allison Gibson, Ph.D.; Perry Owen, M.S.W.; and Vivian Garland, Director of the Catawba Senior Center

CAS – Department of Social Work

Through a collaboration with Winthrop University and the Catawba Indian Nation Senior Center, researchers collected data from the elders of the Catawba Indian Nation to understand the needs of the elders and obtain funding for programs on the reservation. Students collected data by interviewing the elders of the tribe and facilitating biopsychosocial assessments using the "Survey of our Elders IV" tool developed by the U.S. Administration on Aging. The results of our study found the

elders age 55 years and older in this community have higher amounts of diabetes 36.1% compared to the nation level of Native Americans and Indigenous populations (NAIP) at 16.8%, and osteoporosis 8.4% compared to the nation level of NAIP at 4.6%. Along with having higher amounts of diabetes and osteoporosis, Catawba Indian Nation seniors also face higher rates of congestive heart failure 9.2% and stroke 7.9%. Other data that we discovered within this research are that bathing, getting out of bed, and using the toilet are less likely to be reported for assistance within the Catawba tribe compared to the national trends of NAIP. The implications of this research has benefitted the Catawba Indian Nation tribe by having a better understanding of the needs of tribal elders within this community. With the research the tribal Elder Care program has created programs to better educate older adults with programs about healthier food choices, expansion of the respite program, and overall wellness. Programs developed to respond to the elders needs will be discussed as part of the presentation.

## Quantitative X-ray Analysis of Montmorillonite and Kaolinite Mixtures using Zinc Oxide and Corundum Intensity Standards

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the Winthrop University Research Council*

**Students: Ryan M. Arioli and Jessica N. Stevens**

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM351 – Hanna)

Mixtures of crystalline solids can be quantified using carefully collected X-ray data and least-squares refinement of structures, in order to match calculated to experimental data. Rietveld methods are commonly found in a variety of software programs that enable crystal structure refinement. Integrated intensities of different components in a mixture are proportional to the amounts present, thus providing a powerful, nondestructive method for quantitative analysis. Layered compounds, such as clay materials in soils, often exhibit significant preferred orientation, modifying X-ray intensities and introducing challenges to quantitative analysis of samples containing clays, minerals, and amorphous components. For all samples, X-ray powder diffraction data are collected over 3-4 hours, and component structures refined. Here, we present the exploration of different techniques toward a standard procedure for soil samples. For this project, initial experiments were done with quantitative mixtures of montmorillonite or kaolinite, and goethite. After refining each component structure with Rigaku PDXL2 software, integrated intensities produced weight percents within approximately 1% (kaolinite-goethite) and 10% (montmorillonite-goethite) of lab preparations. Current experiments incorporate intensity standards by quantitative addition of zinc oxide or corundum, and these samples are being analyzed with two software programs: PDXL2 (with a FullProf software core) and the Excel-based RockJock. The former software is packaged with the diffractometer software, and the latter is freeware developed specifically for clay-containing samples. Different sample preparations to minimize the effects of preferred orientation are also being examined. All of these analyses serve the development of best practices toward gaining reliable quantitative information on clay mixtures.

## Fitness Assessment of Exercise Science 101 Students

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Hannah Roark**

Faculty Mentor: Janet Wojcik, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(EXSC 484 – Wojcik)

In this study, students in the Exercise Science 101 class at Winthrop University will undergo various assessments of their fitness levels. The testing will include weight and height measurements to determine body mass index (BMI). The students will also undergo a three-site skinfold test to determine their body-fat percentages. Their waist and hip circumferences will be measured to determine their waist-to-hip ratios. A waist-to-hip ratio is a good indicator for risk of potential chronic disease, such as heart disease and diabetes. The students will perform a one-mile walk test to assess their aerobic fitness and a push-up and partial curl-up test to assess their muscular endurance. Then, the flexibility of students' lower backs and hamstrings will be measured through the sit-and-reach test. These tests will show a good indication of an overall fitness profile of the Exercise Science 101 students that will be useful to the students and will help the department to determine program improvements.

## Exploring Interactions between RitR and PhPP in the Presence of DNA and Their Role in Iron Uptake in *S. pneumonia*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Moryanne Rosario**

Faculty Mentor: Nicholas Grossoehme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552 – Hanna)

*Streptococcus pneumonia* is a pathogenic bacterium that is responsible for a large portion of the pneumonia infections in the United States. This organism has a striking ability to survive in a wide range of oxidative environments, suggesting a well-developed oxygen sensory and response mechanism; iron plays a key role in this process. RitR and PhPP have been shown to play essential roles in the regulation and control of iron uptake in the cell. While it is established that interactions between these two proteins occur, it is not understood how. Our research looks to obtain an understanding of how those interactions occur and how the intake of iron can be controlled when sufficient intracellular levels have been reached. The interaction between these two proteins has been explored using techniques such as gel filtration chromatography and enzyme kinetic analysis. Ongoing fluorescence experiments are aimed at investigating the role DNA has in the interaction between the two proteins. Results of this research will allow scientists to have deeper understanding of iron regulation in *S. pneumonia* and may enable development of methods to control its virulent characteristics.

## White College Students' Attitudes Towards White Privilege

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Tucker Chandler**

Faculty Mentor: Monique Constance-Huggins, Ph.D.

CAS – Department of Social Work

(SCWK 330 – Constance-Huggins)

Skin color continues to play a major role in determining social and economic outcomes in our society. Yet many students, particularly Whites, are unaware of, or deny its role. This study seeks to examine attitudes towards White privilege among 50 White students at a small liberal arts college in the South. All students were between ages 18 and 24 and the majority of them (86%) were females. Using the White Privilege Attitude Scale, results show that with a mean score of 92, students are moderately aware of White privilege. A closer look at the sub-domains, however, reveals that students scored lowest on the anticipated cost of addressing White privilege. That is, the majority of students are worried or apprehensive about addressing White privilege. This observation suggests that while students may recognize that there are inequalities in society, many of them may not be motivated enough to take social action to address these inequalities. This result holds important implications for teaching on cultural diversity.

## Black Mental Health Matters: Racial Disparities in Healthcare while Breaking the Stigma on Cultural Practices

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ashley S. Briggs**

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

The goal of the investigation was to inform readers about the racial disparities in the access to health care coverage by focusing on mental health. This investigation explained how a person's cultural practices, residential location and socioeconomic status influence their ability to seek or oppose medical assistance. Based upon different attitudes, African Americans may or may not choose to seek mental health services. The investigation explored the state of South Carolina by examining their policies to make mental treatment affordable for the impoverished. Due to the stigma that is placed on the topic, The research was gathered to spark the conversation of mental health in the African American population. The data in the investigation were gathered by searching through documents from government agencies and mental health organizations such as the U.S. Department of Health and Human Services Office of Minority Health, South Carolina Code of Laws, South Carolina Health Data and National Alliance on Mental Illness. Data were also collected by interviewing a clinical psychiatrist and an individual living with depression. As a result, the data did not support that African Americans refuse to seek medical assistance due to cultural practices, residential location and socioeconomic status.

## The Pitfalls of Adaptation in BBC's *Merlin*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors*  
(SOURCE), Winthrop University, April 2017

**Student: Amy Moore**

Faculty Mentor: Jo Koster, Ph.D.

CAS – Department of English

(ENGL 307 – Koster)

The BBC's *Merlin* is a bright, active, and charming modern take on the stories of King Arthur and the Round Table that are so adored by Western art. However, in this paper I take a critical look at some of the adaptational missteps taken by the writers of *Merlin* through comparison to Chretien de Troyes's "Perceval, or the Story of the Grail" and sections of Sir Thomas Malory's *Le Morte D'Arthur*. These missteps include the inherent problems with removing religion from the hyper-Christian medieval Arthur without replacing its role in the legends with a comparable modern ideological stance; the television series's halfhearted attempts to produce both a retelling of the love among Arthur, Lancelot, and Guinevere and create a passionate love story that will enrapture modern audiences; and the overall lack of narrative cohesion that is *Merlin*'s ultimate downfall as both an adaptation and a piece of art on its own merits. This critical take on BBC *Merlin* is meant to demonstrate that the television series's lack of strong commitment to new narrative and modern morality undermine its attempts to appeal to a secular audience.

## An Athletic Trainer's Role as Social Support to Injured Athletes

*Third Annual Showcase of Undergraduate Research and Creative Endeavors*  
(SOURCE), Winthrop University, April 2017

**Student: Julie Coffey**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

This research study will discuss athletes' psychological and social needs during and after injury, specifically from athletic trainers. Athletes need a source of significant social support to participate in the first place and during rehabilitation from an injury, as well. Many athletes receive many forms of social support to participate in sports, but they also need that social support during an injury. Since athletes tend to be in the athletic training room more often during injury, athletic trainers become even more involved in the athletes' social support. Athletic trainers provide support by setting achievable, short-term goals, providing rehabilitation programs, assisting athletes with exercises and treatment, and encouraging the athletes throughout their rehabilitation. All of these roles of an athletic trainer help athletes feel like healing and returning to their sport is more likely to happen than it would be without an athletic trainer's support. Thus, this research will look at the athletic trainers' role and influence on athletes' perceived progress and motivation in their rehabilitation to return to play.

## Hamlet and Myers-Briggs: A Jungian Analysis

*Third Annual Showcase of Undergraduate Research and Creative Endeavors*  
(SOURCE), Winthrop University, April 2017

**Student: Richard Haley**

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

This paper aspires to use the Myers-Briggs system to categorize Hamlet into one of sixteen different personality types and identify where, how, and why his type is significant to the work as a whole. As an INTJ personality type, Hamlet is a methodical, reclusive individual. Consistent with this type, Hamlet's strategic, efficacious nature gives us insight into the rationales behind his decision-making and additionally offers a rational explanation for his most egregious failures—particularly his hesitation (or lack thereof, in some situations). Many critics such as Kenneth Tucker and Sally Porterfield (among others) explore Hamlet's psychology in depth. Throughout the play, Hamlet struggles with hesitation. A naturally introverted and contemplative individual, Hamlet's eventual motivation to spring into action stems from his desire to attain revenge for both himself and his late father. When he uses his inherent calculated instincts to his advantage, the executions of his plans thrive. It is when he ignores these instincts that he makes several irreversible blunders. Ultimately, possessing a knowledge of Hamlet's personality type can enhance our overall understanding of the work significantly. With this knowledge, we become better acquainted with Hamlet's character and understand him as a three-dimensional person, not merely a two-dimensional character.

## The Effect of Media on the Religious Practices of Millennials

*Third Annual Showcase of Undergraduate Research and Creative Endeavors*  
(SOURCE), Winthrop University, April 2017

**Students: Shannon Simmons, Matthew Lee, Anna Laine Eastham, Mykah Buff, and Erin Williams**

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – Patwardhan)

The advent of digital media has changed many aspects of life in the Millennial generation, including religion. Prior research has found that there is a relationship between media and religious behaviors of Millennials. Research has also found that Millennials are less religious than older generations, and that these shifts are caused by many factors including social media. This study will further knowledge about this topic by analyzing what being religious means to Millennials and how the addition and advancement of social media has changed the religious landscape with comparison to older generations. Using a cross sectional survey, the study will explore Millennials' religious and social media tendencies, any correlation between the two, and their views on being religious in the digital age.



## Equine Occupational Therapy: An Alternative Therapy

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Caroline Matthews**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

Occupational therapy works on the fine motors skills and the ability to perform day-to-day tasks. Occupational therapy is sometimes accompanied by equine therapy, which is the use of horses and horseback riding to develop skills. Perceived benefits of equine therapy include improved speech, focus, self-esteem, swallowing function, potty training, strength, and motor function. Equine therapy exercises work to strengthen hypotonic, or under-performing, muscles and increase the plasticity of hypertonic, or over-performing, muscles. Participants also form bonds with the horse due to unconditional positive regard that they may not feel in a clinical setting. Overall, little research has been done to yield quantitative comparisons between equine therapy and traditional occupational therapy. As a result of the deficit in research on equine therapy, the technique has mostly spread through word of mouth and is not always available for families. Research on equine therapy may increase its availability and the number of occupational therapists willing to work with equine clinics. This would ultimately lead to a higher quality service and a more reliable equine therapy experience. This project will include a review of literature and will investigate the effectiveness of equine therapy in occupational therapy. It is important to know if equine therapy is beneficial for participants so that it can become more widely utilized and more available for families.

## Influence of Facebook and Political Content on its Millennial Users

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Jasmine Williamson, Alyssa N. Sconzo, Asia Alexis Perry, Sydney Amodio, and Eric Lewis**

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

Facebook is a form of social media that shapes public opinion. Millennials are a very impressionable group who are the most influenced by social media content. This study examines attitudes of Facebook users and how political content can affect their Facebook experience. Secondary sources have shown that Facebook use can negatively influence academic performance, well-being, and potentially lead to lack of knowledge of current events. In the coming weeks we will be conducting our own survey research to collect data on the direct influence Facebook and its content has on the second wave of millennials. By exploring the effect of Facebook political content on the well-being, academic performance, and overall Facebook experience of its users, we hope to uncover new insights on millennials, social media and political content.

## Impacts of Drought and Flooding on California Lake Water Levels Using Remote Sensing

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Christina Sadak**

Faculty Mentor: Bryan McFadden, M.S.

CAS – Department of Interdisciplinary Studies

California has been experiencing drier-than-normal conditions for the past fifteen years. In 2014, the driest year in recorded state history, the governor declared a drought state of emergency. In the past four months (mostly in a period of two weeks), rainfall in California has increased exponentially and has more than surpassed the water lost in the drought. This water fluctuation has impacted California lakes, creeks, and reservoirs as well as snowpack conditions in the Sierra Nevada Mountains. The purpose of this study is to utilize satellite imagery collected between 2010 and 2017 from Landsat 5 and Landsat 8 and use the Normalized Difference Water Index (NDWI) and the Normalized Difference Vegetation Index (NDVI) to quantify changes in water levels and its impact on vegetation around Lake Oroville and north-central California.

## Concussion Rehabilitation and Second Impact Syndrome Prevention: A Literature Review

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Caroline Cheesborough and Katherine Hunter Mowery**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

The brain is the most important organ in our bodies, yet it is the most misunderstood. In every contact sport and many non-contact sports, one of the most serious injuries an athlete can sustain is a minor/moderate traumatic brain injury, better known as a concussion. The amount of force the brain might undergo during play is often unacknowledged. While every concussion is unique to itself, the fact remains that proper concussion care is vital to the full recovery of our athletes. Proper rehabilitation and testing protocol is the key to preventing further complications from concussions. If a concussed athlete returns to play without being evaluated, or returns to play too soon after the initial injury, the risk of repeated concussion, or Second Impact Syndrome, vastly increases. Second Impact Syndrome occurs when a concussed athlete sustains a second blow to the head, causing severe swelling, cerebral edema, and often death. Proper rehabilitation can ultimately save an athlete from permanent brain damage, long-term complications, or loss of life. Although treatment plans may differ, a concussed player should be symptom-free and pass concussion testing before returning to play. This literature review will emphasize the proper rehabilitation of minors to prevent Second Impact Syndrome.

## Concertino In E-flat Major, Opus 4 by Ferdinand David

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Preston Wilkes**

Faculty Mentors: Tomoko Deguchi, Ph.D., and Douglas Black Jr., D.M.A.

CVPA – Department of Music

Ferdinand David, a German virtuoso violinist and composer, was born in Hamburg on the 19th of June, 1810. He made his public debut in Leipzig, performing with his sister who played piano. Over the subsequent years he played both as a soloist and as member of the orchestra of Berlin's Königsstädtisches Theater. In 1835 he moved to Russia at the urging of Mendelssohn, a fellow composer and violinist, and became the Konzertmeister (principal violin), his position until his death (1873). David's trombone concertino was composed in 1937 and is in three movements Allegro maestoso, Andante marcia funebre, and Allegro maestoso. The Concertino is in a smaller and freer form as opposed to a Concerto. The movements have little silence in between and contain connecting motifs, making the Concertino more like a single movement piece in three sections. David's Concertino is distinct from other major Concertinos at the time, as it begins with a prolonged exposition based off of the second theme, then the trombone solo enters with a passage in what is in effect an E-flat major triad (the first theme). This theme is found throughout, appearing first in E-flat major, then modulating to B-flat major, and reappearing in the third movement in E-flat major. The only notable controversy surrounding the piece involves the 2nd movement. When compared to the second movement of Beethoven's Symphony No. 3 (1804), the opening phrases are extremely similar and have caused some to accuse David of stealing or at least heavily borrowing from Beethoven.

## The Relationship of College Students to Technology

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Dillon O'Neill, Brianna Temple, Morgan Lowers, Camille Corbeels, and Brittany Fore**

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

This study examines the relationship between college-aged students and educational use of technology now that many teachers have adapted their classrooms to millennials' learning styles. Prior studies have shown that millennials do better with collaborative projects and multimedia resources and have also examined the positive and negative effects of technology on academic performance. Using survey methodology, we will investigate student attitudes toward communication and technology, differences (if any) by major area of study, and relationships between positive attitudes to technology and academic confidence and success. Results should be of use to educators looking to adjust their delivery formats in class to adapt to the ways millennials retain information.

## Youth Sports and Social Development

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Matthew Taylor**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

Youth sports have a crucial impact on many areas of development in a young athlete's life. One of these areas is social development. The importance that participating in youth sports has on a young athlete's social development is immense. Though the progress of social development can be affected by a youth sport, it differs with many different factors. This literature review will cover the effects that perceived parental support, perceived skill competence, socioeconomic status, influence of perception of peer relationships on participation, and other factors have on social development in youth sports.

## Birds and Beasts: An Ecocritical Reading of Character in *Jane Eyre*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Emily Sparrow**

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

(ENGL 300 – Cothran)

Charlotte Brontë's *Jane Eyre* has been analyzed from a breadth of critical perspectives, which most recently includes ecocriticism. Brontë's rich descriptions of nature and emphasis on setting are captivating, and they encapsulate nature's versatility. In this paper, I posit that Brontë does not merely incorporate nature into her novel to serve as an aesthetic element or to play a background role; she interweaves the qualities of nature with her characters and develops nature as its own character. My paper examines the ways in which Brontë portrays male characters—who each exert their oppression over women, the racial Other, and nature itself—versus how she employs nature to empower females. Brontë connects Jane to the natural through the symbol of the bird whereas Bertha is intertwined with nature through her primitivism. Brontë also invokes the supernatural by relating Jane and Bertha to vampires and fairies respectively, which infuses nature with a spirit that is both powerful and clever. Along with granting nature autonomy through characterization, Brontë treats nature as an end in itself. Nature brings the atrocities committed at Lowood to the forefront by breeding sickness, which led to the establishment of better living conditions (Brontë 84). However, at the end of the novel, women, nature, and the racial Other are still confined by the hegemony that upholds the male oppression. Through interlinking Jane, Bertha, and nature, but not fully deconstructing the male/female binary, Brontë conveys the powerful, ubiquitous stronghold of men in Victorian society that proves extremely challenging to alter.

## Production of Chemically-Induced Pluripotent Stem Cells from Adipose-Derived Stem Cells is Limited by Toxicity of the Base Medium and Individual Chemicals

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Hannah Hopfensperger**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Chemically-induced pluripotent stem (CiPS) cells are created without genetic reprogramming from adult cells, through the introduction of small molecules. CiPS represent an attractive source in obtaining stem cells for therapeutic use because they match the differential potential of embryonic stem cells, using an effective procedure and without having to destroy the blastocyst. Following work by Hou et al. (2013), we hypothesized that CiPS cells would be created from ADSCs introduced to a seven-molecule cocktail. However, the ADSCs exposed to the seven molecules and ES medium experienced cell death. We then hypothesized that the base medium, solvents, and/or chemicals are not favorable to the growth conditions of the ADSCs. ADSCs were introduced separately to ethanol, DMSO, and all seven chemicals in either ES or ADSC medium. Our results demonstrate that the ES medium, along with CHIR, Rep Sox, and Forskolin individually, caused unhealthy morphology and cell death in the ADSCs. Future work will seek to reprogram Oct-4 GFP MEFs and ADSCs along with using MACS to sort ADSCs based on SSEA-1 expression prior to spheroid formation. This would enable ADSCs to serve as a source to create CiPS cells, which would ultimately be helpful for skeletal muscle tissue engineering and regenerative medicine applications.

## Method Development of Measuring Metal/Buffer Equilibria and Enthalpy

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Hunter G. Sellers**

Faculty Mentor: Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

An increasing interest has risen in the biochemical community to better understand the relationship between metal ions and metalloregulatory protein transcription. To understand these interactions fully, the affinity of these proteins for the metal ions must be known. However, biological buffers provide a binding competition for the proteins, making direct measurement of metal/protein affinity difficult to achieve, as proteins must have buffers present to bind effectively. Developing a method of studying these metal and buffer interactions is essential to understanding the kinetic and thermodynamic relationships between metals and proteins. Due to a fair number of experimental complications, these metal/buffer interactions are not

easy to measure directly, and require indirect measurement using a metal-binding chromophore. This approach entails first binding a metal to the chromophore in the absence of buffer to enable a comparison with the binding constant when a fixed concentration of buffer is present. This was first tested using UV-spectroscopy; however, the equilibrium between the metal and chromophore could not be seen accurately using the spectrophotometer. To address this problem, the same equilibria were recorded using fluorescence spectroscopy, which allows for a significantly decreased experimental concentration. The  $Zn^{2+}$  – Mag-Fura-2 system was used to pilot this method, and resulted in experimental Zn/buffer affinities that match reference values. Metal-buffer enthalpies were also explored. Isothermal titration calorimetry (ITC) was used to observe the heat exchange as metal and buffer were titrated into EDTA, a high-affinity ligand. The experimental enthalpies were corrected for coupled reactions and the enthalpy of Zn-buffer interactions were determined. While the enthalpies we observed support the validity of the method, there were certain discrepancies in the results of the reaction that warrant further study to validate the method.

## Traveling in Silk and Velvet: A Look at the Story of Joan of England, the Princess that Time Forgot

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Lydia W. James**

Faculty Mentor: Laura Dufresne, Ph.D.

CVPA – Department of Fine Arts

(MDST 305 – Dufresne)

In 1348, Princess Joan, the third born child to Edward III and Philippa, heads off on a journey through France on her way to Castile, all set for an arranged marriage to Prince Peter. In an lavish effort to impress his foreign allies, the King has outfitted his daughter in the best that money can buy. A wedding dress made with more than 150 meters of rakematiz, a thick imported silk embroidered with gold; a suit of red velvet; two sets of twenty four buttons made of silver gilt and enamel; five corsets woven with gold patterns of stars, crescents, and diamonds; a green rakematiz gown with inbuilt corset, embroidered all over with images of rose arbors, wild animals, and wild men; a brown rakematiz gown with inbuilt corset, a base of powdered gold, and an embroidered pattern of roundels, each enclosing a lion as a symbol of monarchy; riding clothes; beds and bed curtains; a portable chapel elaborately decorated with dragons and gold; and many more objects, from 12,000 pins to everyday wear. This elaborate parade of a trousseau is detailed in the Royal Wardrobe Accounts of 1347, one of the only sources for a lost masterpiece of English textile and fashion production. Ignoring the advice of officials in Bordeaux not to land, Joan became the first notable English victim lost in the Plague that swept over France in 1348, and her body and trousseau were eventually lost in a fire that purged the city. Joan was a girl who in the words of her father, Edward III, was "... our dearest daughter, whom we loved best of all, as her virtues demanded." This paper endeavors to recreate what the lost trousseau of Joan looked like, all while exploring the life of a forgotten English princess.

## The Benefits of Music in Occupational Therapy

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Candace Silva**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

Occupational therapy (OT) can be described as the therapeutic use of everyday activities. It functions on the premise of using occupations, or meaningful activities for a person, to rehabilitate or improve a person's life. Music can also be used therapeutically by a certified professional. Music therapy is backed by a growing body of scientific evidence for the benefits of music. However, the therapeutic use of music is in no way limited to certified music therapists. Many occupational therapists already integrate some form of music into their treatment of individuals through music-assisted occupation, music as occupation, and/or music as preparation for occupation. Nevertheless, not much is known about the scientific benefits of incorporating music into traditional occupational therapy treatment. This literature review will cover the positive effects of music-based occupational therapy. Specifically, it will be divided into sections based on the different areas that music-based occupational therapy can improve. This includes pain, movement, emotion and self-expression, cognition, relationships, and personal meaning. All of these factors can lead to enhanced motivation or participation in the therapy process, producing improved results for the client and occupational therapy practitioner.

## YouTube and Millennials

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Kiara Smith, Katie Reynolds, Leire Cullum, Kristina Houseworth, and Kathryn Wooldridge**

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication  
(MCOM 301 – Patwardhan)

Millennials now have more online choices to access information and entertainment, as well as more platforms to use as their own personal media system choices. One of these channels is YouTube. In 2005, Steve Chen, Chad Hurley and Jawed Karim created YouTube as an outlet to share videos through the World Wide Web. Since then, YouTube has become a social platform that provides millennials with information, entertainment, as well as an outlet for sharing their creative work. Prior studies suggest that YouTube content consumption has steadily increased, particularly among younger users. Using a cross sectional survey hosted on the Qualtrics platform, this study will collect data to generate insights on the relationship between millennials and YouTube with reference to level of interest, extent of exposure, and the influence it has on their lives. Questions on the factors that affect their YouTube usage will also be studied. Findings should be of interest to scholars and professionals interested in impact of specific channels on millennial social media attitudes and behaviors.

## Weight Loss through a Ketogenic Diet versus a Low-Fat Diet

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Carlie Skelton**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

This project explores which diet causes more rapid weight loss in the healthiest and most beneficial way for the body, the ketogenic diet or a low-fat diet. The ketogenic diet is a diet consisting of low carbohydrates, and consuming a lot of foods containing high amounts of good fats, such as different kinds of beef. In order for the diet to be the most efficient, it is recommended that one stay away from sugar, in general. If one is to go on a high-fat or ketogenic diet, consuming carbs and sugars while taking in a high amount of fats will cause the diet to have the opposite reaction to weight loss, because then one is consuming all three – fats, carbs, and sugars – which we know causes weight gain. Research studies have shown that a low-fat diet can actually cause one to gain weight instead of losing weight and that it is not good for the body. The good fats that we eat control our appetite and provide the feeling we acquire when we are full. Also, the brain requires fat to have proper neurological function, so essentially it is unhealthy to cut out fats from food consumption. So far, the research evidence is pointing toward the ketogenic diet being more beneficial for rapid and healthy weight loss than the low-fat diet.

## Importance, Causes, and Effects of Sleep Loss on Athletes

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Hannah Roark**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

Sleep is an essential aspect of recovery and preparation for physical activity. Therefore, it is a necessity for athletes to sleep for the recommended amount (7-9 hours) each night. If there are disturbances with the timing, duration, or quality of sleep, psychological and physical recovery may be incomplete. Poor sleep can cause worse athletic performance and faster fatigue. Unfortunately, athletes face many situations that can lead to an insufficient amount of sleep. Travel is common among most sports at a collegiate level. Travel fatigue can cause sleep disturbances, which can lead to a worse mood, can cause worse sleep at the destination, and decrease motivation. Travel between time zones can cause jet lag and inadequate sleep quality and quantity. Sports teams will often schedule multiple matches per week, which does not allow the athletes enough time to recover and can lead to overtraining. Muscle damage can accumulate, increasing soreness and decreasing sleep quality. Team sport matches that are played at night cause athletes to have sleep disturbances because physical activity increases arousal. The purpose of this literature review is to outline the importance of sleep in athletes, factors that can cause sleep loss, and the effects sleep loss has on athletic performance.

## The Effects of a Neutropenic Diet on Immunosuppressed Patients

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Mallary McFadden**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

Having the correct range of white blood cell count allows the body to protect itself against harmful bacteria and fight against infection. When the body has low white blood cell counts, it is very susceptible to infection, and bacteria that enter the body pose a dangerous threat. Patients with immunosuppression, especially cancer patients, are often placed on a neutropenic diet in order to reduce bacteria entering the body. Food is a great transportation system for harmful bacteria to enter the body and cause serious infections. The neutropenic diet reduces the bacteria in foods by eliminating raw and uncooked fruits and vegetables, as well as other items. Certain cancer treatments can impact immunosuppressed patients' situations very dramatically, and bacteria that may not affect the average person can be life-threatening for them. The evidence supporting the neutropenic diet is limited and the benefits of it are controversial. However, despite the lack of evidence, physicians and registered dietitians do continue to prescribe the neutropenic diet. This is because it is not certain whether the diet does benefit the patient in the fight against infections. The use of the neutropenic diet is often prescribed based on the rationale that eliminating potentially harmful bacteria to those with neutropenia will provide a safer internal environment, and a better situation for facing their illness. This study will analyze the necessity and benefits of using the neutropenic diet for patients with cancer and immunosuppression.

## Investigating the Degree of Remodeling in the Medial and Lateral Distal Femur with Scanning Electron Microscopy

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ashley Graham**

Faculty Mentors: Julian Smith III, Ph.D., and Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

(BIOL 471 – Smith)

Bone remodels in response to stress, replacing damaged bone tissue with new secondary osteons. A secondary osteon can be seen using backscatter mode on a scanning electron microscope as a gray circular area with a black haversian canal in the center and a bright white cement line around the outer perimeter. BSE compo mode shows areas with higher mineralization as brighter and areas of lower mineralization as darker gray. Secondary osteons are recognizable by their cement lines and darker gray appearance, as they are less mineralized than primary bone. The number of secondary osteons per unit area of bone can indicate how much the bone has had to remodel. In a BSE compo image, the mean gray value excluding

haversian canals for a given area may indicate how much remodeling has occurred, because the darker the average gray value, the more the image is composed of secondary osteons. Slices of bone from the medial and lateral sides of the femora were embedded in resin, polished and imaged on the SEM in BSE compo mode. The mean gray values were compared between the medial slices and the lateral slices, to determine whether one side had more remodeling than the other. The preliminary data from this experiment on slices from one femur suggested that there was no significant difference between the number of secondary osteons per unit area in the medial side and in the lateral side; thus, it could be concluded that neither side has had to remodel more in response to stress. However, more data from a greater sample size were collected in this experiment.

## LGBTQ Equality Movement, Reactionary Laws, Establishment Clause, and How it Relates to the Civil Rights Movement

*The Carolinas Conference: Joint Meeting of the North Carolina and South Carolina Political Science Associations, Winthrop University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ryan M. Arioli**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Political Science

(PLSC 507 – Disney)

How are the local, state, and federal government able to continually deny the LGBTQ community equality based on traditional values? These traditional values are based solely on a religion, and our country has no established religion, and cannot make a law respecting the establishment of religion under the Establishment Clause. How are state and local governments able to pass laws with religious exemptions, laws that take away protections for members of the LGBTQ community, and laws that allow for discrimination without federal intervention? Critics contend that society should be loath to provide protections for religious believers, because those protections will hamper otherwise desirable social change. The public will invariably be blindsided by all objections, whether the right to object comes from a generalized protection like RFRA or an exemption from a particular law. Permitting religious objection necessarily will impose costs on third parties or the public generally; and providing a religious accommodation places objectors above the law, giving them special license to discriminate. This can be seen in some states that permit religious organizations to limit marriage retreats and marriage counseling to couples who mirror the group's vision of marriage and to limit membership in fraternal organizations to individuals in marriages the organization recognizes. As legal scholars Douglas Ne Jaime and Reva Siegel point out in *The Yale Law Journal*, unlike attempts to protect free exercise of religion, such as the right to use peyote as part of a Native American religious practice, these religious exemption laws cause real harm to third parties, such as LGBT people, same-sex couples, and others who do not conform to particular religious orthodoxies. The proponents of religious marriage exemptions have countered that marriage equality is different, because many people harbor religious objections to same-sex marriage and homosexuality.



## Adsorption/Desorption of Magnesium to enhance Phosphorus Recovery in Wastewater

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Science Foundation*

**Student: Tianee Harris**

Faculty Mentors: Lynn Katz, Ph.D., and Joon Hann, M.S., University of Texas, Austin

CAS – Department of Interdisciplinary Studies

With a growing population and non-renewable reserves of phosphorous, there are concerns for future availability of this essential element. Currently, phosphorous is mined from phosphate rock deposits, but some estimates suggest that there will be a shortage of this resource by the end of the century. However, phosphorous can be recovered from sources such as wastewater and biosolids. Phosphorus recovery can decrease the risk of eutrophication, improve surface water health, and reduce the need for mining and refining P-bearing minerals. One approach is to precipitate the phosphorous from wastewater (e.g., urine) in minerals such as struvite ( $\text{MgNH}_4\text{PO}_4(\text{s})$ ). When the amount of Mg is increased, more phosphorus can be recovered. However, this uses more Mg than stoichiometrically required. In hopes of eliminating the loss of Mg, we are trying to recover and reuse the excess Mg added during precipitation. An iron oxide-based adsorption process was used to recover and reuse magnesium from the effluent of the struvite precipitation process. In doing so, we found that granular iron oxide (E33) has the potential to adsorb Mg from urine and struvite precipitation supernatant. We found that, as pH increases, the adsorption capacity of Mg increases. When phosphate is present in the synthetic urine solution, the adsorption of Mg is enhanced, and Mg enhances adsorption of phosphate to E33. Thus, supernatant phosphate can also be recovered in this process. Finally, Mg was successfully desorbed from the E33 at pH 4.5, which demonstrates the potential of this process for recovering and recycling Mg in struvite precipitation processes.

## Strength Training and ACL Injury Prevention

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Eric Orton**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

This research project will show how strength training habits are related to the risk of noncontact anterior cruciate ligament (ACL) injuries in high-school male athletes. Strength training is classified as physical activity that uses resistance to build muscular strength. Research shows that, as muscles grow, the functional capabilities of the ligaments and tendons increase, as well. This could mean that strength training could help prevent ACL injuries. The ACL is a cruciate ligament that attaches

the anterior part of the tibia to the posterior part of the femur and functions to prevent hyperextension. The ACL is subject to injury especially by tearing. ACL tears are one of the most common injuries in sports today. There has not been much research on what training methods best prevent ACL tears from occurring. This is because there are very few ways to measure the strength of an ACL specifically before it is injured. However, there are ways to look at the biomechanics of the knee joint and measure the functionality of the knee. Looking at the biomechanics of the knee can also help assess when that joint is under the greatest amount of stress and is most prone to an ACL tear. ACL tears are classified on a grade scale, from a grade 1 sprain, being mildly damaged, to a grade 3 sprain, being severely damaged. The goal of this research project will be to figure out whether strength training play a positive or negative role in ACL injuries before they happen. This research project also aims to explore what the most suitable training method is to best prevent ACL injuries before they happen.

## Gunshots Just Outside Your Window Are Not the End of the World

*The Carolinas Conference: Joint Meeting of the North Carolina and South Carolina Political Science Associations, Winthrop University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Gedney Howe**

Faculty Mentors: Michael Lipscomb, Ph.D., and Stephen Smith, Ph.D.

CAS – Department of Political Science

(PLSC 490 – Lipscomb, Smith)

One of the most pressing questions in current International Relations is: Can the North Atlantic Treaty Organization (NATO) and their touted but untested Collective Defense clause protect the Baltic States – Estonia, Latvia, and Lithuania – from a Russian invasion? This question affects not only the millions of people living in these three countries, but also those in over a dozen other former Soviet states. This paper introduces the theoretical lens of International Relations Realism to address this question, and explains why it is the most appropriate and direct way to study the issues in the Baltics. It then describes how the Baltic States' geographic proximity to Russia and their significant minority populations of ethnic Russians make them both appealing and vulnerable to Russia, as well as what the West has done to provoke Russia. Even if NATO is capable and willing to defend the Baltics, forces would not be able to mobilize for at least 48 hours; therefore, Estonia and Latvia have already set up preemptive defense strategies based on the Swiss government's system during the Cold War. After explaining the measures in place in the Baltic States, the paper explains how NATO creates their forces and where they get their funding, and distinguishes reality from propaganda by identifying what belongs to NATO and what belongs to the United States. It then compares the power of NATO to that of Russia regarding armored units, and addresses the Baltic States' lack of infrastructure to support the fundamental armored units to defend them from invasion. The paper argues that NATO lacks the financial and military capacity to defend the Baltic States from their Russian aggressors with internal reforms alone. While an amended budget and an increase in NATO forces are essential to Baltic defense, the Baltics must supplement such reforms with an increase in their own military presence.

## Injury Prevention During the Golf Swing

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Michael Joslin**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

Golf is a sport that is growing in popularity, not only in the U.S., but all over the world. Golfers today are much more fit and much stronger than they were in the 1900s. The golf swing has grown into a very powerful motion, creating club head speeds of up to 125 mph. In order to create these speeds, the body must go through significant stress to generate enough power to launch the ball over 300 yards. This research will look into muscle activity during the golf swing and how to prevent injury in the lumbar region of the back. Many professional golfers have suffered from lower back pain either during their professional careers or after they have retired. This research will be focused on the muscle activity in the thoracic and lumbar regions of the back as well as the abdominal muscles that are used to create this complex movement.

## Mapping of a Female Meiotic Mutant, *mei-S282*, in *Drosophila melanogaster*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Misaki Tillis**

Faculty Mentor: Kathryn Kohl, Ph.D.

CAS – Department of Biology  
(BIOL 471 – Kohl)

Meiosis is a specialized form of cell division responsible for the formation of haploid gametes utilized in sexual reproduction. During this process, meiotic recombination is essential to increase genetic diversity and ensure proper chromosome segregation. Mutations disrupting meiotic recombination can result in nondisjunction (NDJ), the failure of chromosomes to separate. Many such mutations have been identified in *Drosophila melanogaster*, including *mei-S282*. *mei-S282* is a female meiotic mutant isolated in Italy in 1972, which is characterized by elevated NDJ at the first meiotic division and decreased recombination levels. While the overall goal of this research is to map *mei-S282* to a precise locus, the purpose of this particular study is to determine whether the *mei-S282* mutation is still present within the *Drosophila* stock received. Since the mutation's approximate location has been previously mapped to position 5 on the third chromosome (3L), a deficiency of this region was crossed with our *mei-S282* stock to generate homozygous female mutants at this locus. After all crosses were performed, the progeny were scored for NDJ to determine if the original mutation was still present.

## Using Geospatial Technology to create a Database of Winthrop University's Trees

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Tianee Harris**

Faculty Mentor: Bryan McFadden, M.S.

CAS – Department of Interdisciplinary Studies

Trees on the Winthrop campus are a critical part of the University's infrastructure. They need to be managed to ensure they provide the many benefits trees offer while also reducing the harm that can come from aging or pest infested trees. Geographic Information Systems (GIS) can assist in the management of these resources by providing tools that facilitate the collection and analysis of the spatial and attribute characteristics of individual trees. By keeping an open database of Winthrop University's tree data, students and faculty can assist in the classification, aging, and overall health status of campus trees. This database will be created using a mobile, GPS-enabled laser measurement device that will permit the collection of tree locations as well as a photo of that tree. From the photo one can capture real time measurements including height, width, area, and length. The data about each tree will be automatically uploaded to an online GIS database allowing students and faculty to add additional information such as species, date of last inspection, and other physical features. The end result of this specific study involves having a documented, consistent record of Winthrop University's trees in a collaborative, interdisciplinary learning environment.

## Diurnal Synchronization of the Cell Cycle in *Aeolosoma* (Annelida)

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Shane Ira C. Lacanin**

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology

It is observed by many that physiological, metabolic, and behavioral changes occur in most organisms over 24 hours, frequently synchronized to the light/dark cycle. It has been shown that the cell division (M-phase) and DNA replication (S-phase) occur during the night in many organisms, perhaps because these events of the cell cycle are sensitive to sunlight. The small annelid worm *Aeolosoma* possesses no pigmentation and lives in freshwater ponds, exposed to sunlight. Our hypothesis is that, if the S-phase and M-phase of the cell cycle of most creatures are more likely to happen at night, then the same should happen to this organism. We used EdU labeling to observe S-phase. Mitotic cells were labeled with anti-phosH3 and the nuclei of the cells were stained with Hoechst 33342. The confocal-laser-scanning microscope stacks were used to count the cells that were in M-phase and S-phase. These findings will supplement results that are already in hand and will allow us to test our hypothesis further.

## Meiofaunal Flatworm Diet Analysis via Diagnostic PCR

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Paige Powers**

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology

Studies of meiofaunal food webs are hindered because a scarce number of prey have features that allow identification and persist long enough in the predator's digestive tract. PCR-based approaches have proven to be successful methods for identifying and amplifying prey sequences from the digestive tracts of predators. In this paper, we will report the effective use of prey-taxon-specific primers in diagnostic PCR to identify prey, to the species level, in meiofaunal flatworms. The predator species in focus will be *Proschizorhynchella*, a kalyptorhynch flatworm. The prey species in focus will be *Amphipoda*, commonly known as amphipods, and *Decapoda*, commonly known as decapods. An alignment of crustacean 18S rDNA sequences will be generated, and primers specific to amphipods and decapods, that have never been designed before, will be created. Continuation of this method will permit establishment of the marine meiofaunal food web at the species level.

## Little Did We Know – Charlotte Water Data Show June Lead Contamination

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Brandon Byron**

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

This report seeks to challenge the safety of municipal water in North Carolina – specifically, the city of Charlotte – under the current regulations set by the US Environmental Protection Agency (EPA) and the North Carolina Department of Environmental Quality (DEQ). The NC DEQ provided nearly 10,000 individual organic and inorganic water samples taken over 12 months for this investigation. The data – recorded by all of Charlotte's municipal water systems – showed an isolated event in which lead concentrations in Charlotte's largest water system exceeded the EPA limitation by 360 percent. It is unclear how many of the 960,000 recipients of Charlotte Water may have been exposed to lead-tainted water; the EPA does not require officials to notify the public of compromised standards as long as toxic samples do not exceed ten-percent of the sampling pool. Furthermore, the causation of lead contamination remains unknown, although past studies in hydrogeology narrow the possibilities. This study attempts to decide whether this contamination event is a matter of public concern, especially if the likelihood of reoccurrence is likely. If ten-percent of North Carolina public water is unsafe to consume and permitted to reach the public without warning, the question remains: *Are the current EPA and DEQ regulations in the best interest of the public?*

## Queer Theater: The Performance of Gender and Sexuality in William Shakespeare's *As You Like It*

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Emily Thomas**

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

My essay argues that gender and sexuality are a performance that is influenced by the environment of the characters in William Shakespeare's *As You Like It*. A critical point raised by Nancy K. Hayles is that when Rosalind is disguised as Ganymede, she finds it easy to perform the role of a male. The concept of gender (and sexuality) as a performance forms the foundation of my argument. I also support my argument with queer theorist Judith Butler's ideas on gender and sexuality as a performance. My thesis is "Shakespeare's *As You Like It* derails the conventions of sexuality and gender, proclaiming the idea that they are performative in nature and influenced by a character's environment." My essay is an examination of gender and sexuality in *As You Like It*, involving the context of early modern England, Shakespearean theater, the mythology of Ganymede, and Shakespeare's references to Marlowe's *Hero and Leander*. I argue that gender and sexuality are a performance, especially in the Forest of Arden, because Rosalind is in disguise as Ganymede and Orlando play acts with her. I was able to conclude that the location is a necessary device that affects the outcome of a performance of gender and sexuality, as well as the mythology of Ganymede being an essential component to understanding Rosalind's performance of Ganymede.

## Using Classroom Transitions as Opportunities for Phonological Awareness Practice

*South Carolina Early Childhood Association (SCECA) Conference, Myrtle Beach, South Carolina January 2017*

**Students: Claire Berchtold, Cassidy Laber, and Delayna Burroughs**

Faculty Mentor: Shawwna Helf, Ph.D.

COE – Department of Curriculum and Pedagogy

Phonological awareness encompasses three main subsets of skills: awareness of words, syllables, and sounds. These three skills work in concert to support students' reading development. By purposefully utilizing time in the classroom, teachers can embed phonological awareness activities during common transitions, thus maximizing instruction. Through these deliberately planned activities, teachers can not only provide effective instruction, but they can ensure that throughout the school day, transitions run smoothly with fewer disruptions and off-task behaviors. We were interested in encouraging teachers to review common transitions in their classroom schedule and begin viewing those periods of time as opportunities for learning. We provided ideas for embedding phonological awareness training during transitions and offered considerations for practice.

## Combating Childhood Obesity in Elementary Schools

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Taylor McLeod**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

The number of children suffering from obesity is a growing concern across the United States. Children who are obese have been faced with medical conditions such as Type 2 diabetes, asthma, heart disease, and hypertension. Studies have shown that children who do not have adequate information about health and physical activity tend to lead sedentary lifestyles as they reach adulthood. This research will study the effects of increased exposure to various exercise techniques and health education in school on children ages six to twelve to see if it will play a role in their lifestyle choices and behaviors in their later years. Researchers have found that elementary schools can have a positive influence on a child's physical activity level. They have also found that by structuring the physical activity time available at school, recess, children are more willing to participate. Their overall goal was to expose children to various new activities through health promotion. This could better the chances of the children's finding an exercise they are interested in, thus increasing their chances for physical activity in the future. This literature review will analyze the effect that teachers, intervention programs, and health education play on encouraging the progressively sedentary youth to get active.

## Observation of Adsorbed Cu<sup>2+</sup> by a Winthrop Biofilm Using SEM-EDS

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Brent A. Shuman**

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology  
(BIOL 530 – Smith)

Biofilms are collections of bacteria that congregate to better their chance for survival. To create the biofilm, bacteria secrete a mixture of polysaccharides, proteins, and nucleic acids, which is known as the extracellular polymeric substance (EPS). This EPS attaches the cells to a surface, traps nutrients, and allows for horizontal gene transfer. It has been documented that some biofilms can take up metal ions from their environment, and have been used in the bioremediation of polluted areas. A previous experiment showed that a biofilm collected from the Winthrop Successional Plots was able to adsorb copper from its environment. In this experiment, the same biofilm was exposed to copper in order to determine the location of copper storage. The specimens were sectioned and fractured using the Tanaka protocol, in order to view the inside of the biofilm, and SEM-EDS was used both to determine if there was a difference in the amount of copper present between the experimental and control groups, and if there was a difference in the amount of copper present between the EPS and the cells.

## Reforestation in the Sichuan Province of China

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Alexander Tsiukes and Jessica M. Brugh**

Faculty Mentor: Bryan McFadden, M.S.

CAS – Department of Interdisciplinary Studies  
(GEOG 320 – McFadden)

Remote sensing involves using satellite imagery to quantify change in the world around us. The field of remote sensing is a facet of geography that is essential to our being proactive rather than reactive to issues present in the environment. Our project uses remote sensing to analyze the effectiveness of the reforestation efforts in China with our goal being to assess the impact of these efforts by quantifying the reforestation in the province. Specifically, we focused on the Sichuan Province, which is located in the southwest portion of the country. This province was estimated to be 57% forested for the first millennium B.C.E.; however, over the last fifty years, the province has experienced massive deforestation due to a high demand for fiber, fuel, and agricultural land in addition to the logging industry, which became central to the province's economy. Combined, these factors essentially exhausted the vegetation in the area, which is made more detrimental when one considers the loss of biodiversity—a celebrated aspect of the province due to it being the home of the Giant Panda—that accompanies the loss of forested areas. In order to combat deforestation, the government implemented two programs, the Natural Forest Protection Program (NFPP)—a ten year plan designed to restore damaged environmental areas and protect remaining areas—and the Sloping Land Conversion Program (SLCP) that converts agricultural land to forests or grasslands. Ultimately, the government was overall successful in their efforts to reforest.

## The Effects Different Coaching Styles Have on Female Collegiate Athletes

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Keaupono K. Fey**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

Sports have become a crucial part of today's society, and an important factor in athlete performance is coaching. Different coaching styles can lead to athletes behaving and participating in many different manners. An issue in today's athletic world is the effects coaching has on athletes and their athletic performance. Some main themes brought up in the literature include leadership, self-determination theory, autonomy support, intrinsic versus extrinsic motivation, and psychological needs and well-being. The particular focus of this literature review is on the ways that different coaching styles can affect female collegiate athletic performance.



## The Real and Perceived Influence of Femininity and Masculinity on Relational Attachment

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; McNair TRIO Research Symposium, Columbia, South Carolina, June 2016; The Society for Personality and Social Psychology (SPSP), San Antonio, Texas, January 2017*

**Student: Tollie J. Schultz, McNair Scholar**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

Research has sought to examine the psychological mechanisms involved in differences in men and women's behavioral patterns. Although some differences may be explained by sex, socially constructed gender roles also affect individuals' behavioral patterns. For the present study, we examined masculine and feminine personality traits (i.e., gender role adherence) as predictors of women's relational attachment. In addition, we investigated participants' perceptions of others' attachment styles, based on the targets' ascribed masculine or feminine traits and gender-typical names. We found that women who were more feminine were less likely to be avoidant ( $B = -0.60$ ,  $SE = 0.17$ ,  $p = 0.001$ ) and those who were more masculine were less anxious ( $B = -0.37$ ,  $SE = 0.13$ ,  $p = 0.006$ ). In terms of perceptions of others, targets with feminine traits were viewed as having more anxious ( $M = 4.90$ ,  $SD = 1.50$ ) or secure ( $M = 4.97$ ,  $SD = 1.57$ ) attachment styles than masculine targets ( $M = 3.94$ ,  $SD = 1.83$ ;  $M = 3.42$ ,  $SD = 1.60$ ), while masculine targets were viewed as more avoidant ( $M = 5.10$ ,  $SD = 1.49$ ) than their feminine counterparts ( $M = 3.10$ ,  $SD = 1.50$ ). Gender-typical names had no effect. Our findings suggest that gender differences in behavior may be due to trait masculinity and femininity and social perceptions of gender.

## Probing the Activation Mechanism of BAK in Mitochondrial Apoptosis

*American Society for Biochemistry and Molecular Biology (ASBMB) Annual Meeting, Chicago, Illinois, March 2017*

**Student: Michala Tesney**

Faculty Mentor: Tudor Moldoveanu, Ph.D., St. Jude Children's Research Hospital

CAS – Department of Chemistry, Physics, and Geology

Proteins of the B-cell Lymphoma 2 (BCL-2) family are the main regulators of mitochondrial outer membrane permeabilization (MOMP), the initiating event of the caspase cascade during mitochondrial apoptosis. Upon activation by BID binding to its trigger site, the BCL-2 effector, Bcl-2 Antagonist Killer (BAK) mediates MOMP. The mechanism of BAK oligomerization during MOMP remains poorly understood and controversial. It is postulated to involve sequential dimerization at an extensive interface overlapping the trigger site, followed by weak-affinity association of dimers at a poorly defined interface mediated by helix  $\alpha 6$ . Here, we probed the oligomerization mechanism, using disulfide-bonded dimers of BAK engineered to trap the  $\alpha 6$ - $\alpha 6$  interface. Using functional assays based on permeabilization of large unilamellar vesicles (LUVs) that mimic the outer mitochondrial membrane (OMM), and Size Exclusion Chromatography Multi-Angle Light Scattering, we have refined our current model for BAK-mediated MOMP in apoptosis.

## How Do Parent-to-Parent Relationships Affect the Romantic Relationships of Adult Children?

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Stephanie Maree Vieweg, Aaliyah Chauntel Scott, and Rebie Mae Ferrell**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

The intent of our research was to find if parent-to-parent relationships (conflict and satisfaction) impact their child's romantic relationships in adulthood. Schmidt, Green, and Prouty (2016) studied the effects of parent-to-parent conflict on children's relational behaviors. They found a relationship between parental infidelity and increased potential for the child to have loyalty conflicts in their own romantic relationships. Our hypothesis is that if a parent-to-parent relationship has high satisfaction, then the child will have high satisfaction in their romantic relationships in adulthood. Also, if a parent-to-parent relationship has high conflict, then the child will have high conflict with their romantic relationships in adulthood. We used two regression analyses. Parental satisfaction ( $\beta = -0.06$ , ns) was not a significant predictor of child relationship satisfaction,  $F(1, 113) = 0.43$ , ns,  $R^2 = 0.004$ . Parental conflict ( $\beta = 0.18$ ,  $p = 0.049$ ) was a significant predictor of child relationship conflict,  $F(1, 113) = 3.95$ ,  $p = 0.049$ ,  $R^2 = 0.03$ . In conclusion, if parents have high conflict within their relationship, then their children will also have high conflict. There was not a significant association between parental satisfaction and child satisfaction. Parental conflict does seem to impact children's lives in adulthood.

## Working on the Inside: Feminism and the Judicial System

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016*

**Student: Lauren Michelle Miller**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Interdisciplinary Studies

(WMST 337/PLSC 337 – Disney)

How can justice be done within a corrupt system? Can oppression be overcome from within the very system that is doing the oppressing? This paper explores the intersection of feminism, human rights, civil rights, and the judicial system. Legislation has been a crucial part of women's movements across the globe. Discussing feminist lawyers, such as Sedigheh Dowlatbadi and Shirin Ebadi of Iran, gives a clear example of opposing the ideals of a system while working within it. By looking at the relationship between legal reform and cultural reform, it is possible to debate which one should ideally come first when seeking true reform for society.



## Expression of Heart-Specific, Fluorescent Reporter Plasmids in *Ciona intestinalis* Juveniles

*South Carolina Academy of Science Annual Meeting, Coastal Carolina University, March 2017*

**Student: Brooke Davis**

Faculty Mentor: Heather Evans-Anderson, Ph.D.

CAS – Department of Biology

(BIOL 471 – Evans-Anderson)

*Ciona intestinalis*, more commonly known as sea squirts, are sessile invertebrates that have many benefits as a model system to study developmental biology. Our focus is on heart development, and in this study, we will utilize three different plasmids to generate transgenic embryos, with hopes of getting the *Ciona intestinalis* to express a fluorescent reporter in the developing juvenile heart. Plasmids will be delivered to *Ciona* embryos via electroporation, immediately following fertilization and dechorination. Fluorescent reporter expression will be driven by the well-characterized Mesp promoter, which Stolfi et al. (2010) have shown to be expressed in the heart progenitor cells in *Ciona* larvae. After metamorphosis, the heart progenitor cells become differentiated into cardiac cells that form the heart in the early juvenile stage. Expression of the Mesp-driven reporter genes has not been examined in the post-metamorphic stages of *Ciona* development. Three different fluorescent reporters will be tested, in order to determine which one will remain detectable in the juvenile stage when the heart has formed: Mesp-H2B-cherry, Mesp-H2B-venus, and Mesp-H2B-GFP. Once the conditions for expression of a fluorescent reporter in the juvenile heart are established, this will allow for further studies in which the growth of the heart can be quantitatively analyzed via fluorescent microscopy.

## Evaluation of the High Mobility Group A1 Proteins (HMGA1) as a Key Mediator in the Anticancer Activity of EF24

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Students: Madeline Diaz, McNair Scholar; Lauren Travis; and Sommer Barber**

Faculty Mentor: Takita Sumter, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The architectural chromatin binding proteins, High Mobility Group A1 (HMGA1), are some of the most overexpressed proteins in malignant cancers and can induce neoplastic transformation. The protein is increased as the last step of a prominent colon cancer progression pathway and mediates drug resistance, therefore correlating with a poor patient prognosis. HMGA1-mediated chemoresistance results from a self-protective process called cellular senescence. Analogs of the antioxidant curcumin, the active ingredient in turmeric, when used in combination

with traditional chemotherapeutic agents, are useful treatment options for drug-resistant tumors. This study had two specific aims. The first goal was to investigate how HCT116 colon cancer cells respond to treatment with EF24. The second aim was to evaluate how *hmga1* expression changed as a result of treatment with EF24. Our preliminary findings showed that cell viability decreased after 24-hour treatment with low-dose EF24, as indicated by an MTS assay, with notable discrepancies between cells that underwent a pulsed treatment regimen versus those that underwent continuous treatment. Furthermore, we demonstrated that cells exhibited fragmented DNA when treated with low-dose EF24, which is characteristic of apoptotic cells. At higher, pulsed doses, senescence activity increased, indicating the induction of a senescence pathway. Lastly, gene expression studies indicated that *hmga1* was significantly down-regulated in cells treated with continuous, low-dose EF24. Further investigation of this pathway could lead to decreased toxicity and increased viability of combination cancer therapies.

## State Repression in Mexican Social Movements: Tlatelolco and Ayotzinapa

*The Carolinas Conference: Joint Meeting of the North Carolina and South Carolina Political Science Associations, Winthrop University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ana Karen Castellanos**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Political Science

(PLSC 507 – Disney)

This paper attempts to analyze a facet of the Mexican government's corruption; the first goal is to understand the injustices faced by the Mexican people that led to El Movimiento Estudiantil, the Student Movement of 1968. This essay will discuss the country's history of conflict, the events leading up to La Masacre de Tlatelolco, the government repression in its multiple forms, and the consequences of such repression. In doing this, I will make connections between the disappearance of los normalistas, forty-three student activists who disappeared at the hands of local Mexican police. The Mexican government's repression has left its constituents' grievances unaddressed, thus causing a resurgence of insurgency; the government's silencing of the protesters merely swept the problems of the Mexican people under a dirty rug, which inevitably rose again. The Student Movement was started by college students, but expanded to include a wider range of demands; they were joined by virtually the entire Mexican populace. Forty-six years later, student activists in their late teens and early twenties from the Normal Rural School of Ayotzinapa were attacked by state police in Guerrero. They were on their way to La Ciudad de México from Guerrero to honor the martyrs who died in the Massacre of Tlatelolco, proving that, when the government attempts to silence its people with the use of violence, it will work against its favor, as more disruption will arise out of the anger directly caused by the violence.

## Promoting the Use of Active Reading Comprehension Strategies

*42nd Annual Conference of the South Carolina International Reading Association, Hilton Head, South Carolina, February 2017*

**Students: Phyllis Economy, Casey Davis, and Courtney Bishop**

Faculty Mentor: Shawna Helf, Ph.D.

COE – Department of Curriculum and Pedagogy

Reading is a complex process that requires intentional and thoughtful interaction between the reader and the text. Good readers think about what they're reading, monitor their comprehension by asking themselves questions as they read, and use that information to develop an understanding of the text. We wished to examine strategies that help students actively engage in the reading process and assisting teachers in integrating this instruction into their regular literacy routines. We identified three strategies to actively engage students in comprehension development: think-pair-share, directed reading-thinking activity, and question-answer relationships. For each, we designed demonstrations of the strategy, shared examples from classrooms (across content areas), and outlined steps for successful implementation, including instructional considerations for diverse learners and students with special needs.

## How Underdeveloped Cities Contribute to the Lack of Gender Identity Education in American Youth

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Robert Anthony Sale**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Interdisciplinary Studies

(WMST 300 – Disney)

While a majority of American children are typically perceived as highly educated, they are, in fact, enslaved by the chains of financial struggles within their own homes, communities, and cities. This financial constriction not only plays a vital role in their future mental health, but also their growth into adulthood. Too often, these youth in areas stricken with financial hardship are raised in gender-demanding homes, where they lack self-discovery time indispensable to their identity. When suffering cities tend to their underage children, gender identity educational opportunities tend to be inadequate or absent. Subsequently, children are forced to identify with one gender, which is usually determined by their parents. As a growing number of the American population are identifying with terms such as "gender-fluid," "transgender," and "gender non-conforming," children in poorer cities are, unfortunately, barricaded from the ability to learn about the gender spectrum and where they may lie. This creates a widening gap between children raised in middle to upper-class homes and those in lower-class homes. Because our country is experiencing a shrinking middle class, and only a small portion of Americans are considered "upper-class citizens," the remaining lower-class youth are oppressed financially through their lack of opportunity. Ultimately, the upper class remains privileged in gender identity security, something all Americans should be able to access.

## Using Repeated Reading to Improve Reading Comprehension for Students with ASD

*South Carolina Council for Exceptional Children Annual Conference, Myrtle Beach, South Carolina, February 2017*

**Students: Marlee Bos, Mary Beth Mize, and Brittany Bullard**

Faculty Mentors: Debra Leach, Ed.D, and Shawna Helf, Ph.D.

COE – Department of Counseling, Leadership, and Educational Studies

This project involved conducting action research in a middle school classroom to test the impact of repeated readings on the reading comprehension of students with autism spectrum disorders. Given the fact that students with autism spectrum disorders have significant language impairments, the hypothesis was that allowing the students to read passages three times prior to assessing their comprehension would improve their ability to comprehend text since they would have greater opportunities to process the language of the text. The initial results of the study did not show significant gains in the reading comprehension of students with ASD. Therefore, additional strategies were added to the intervention including positive reinforcement for participation and previewing the questions prior to reading. This resulted in gains in reading comprehension scores, which also generalized to benchmark testing that was conducted prior to the implementation of the study and at the conclusion of the study.

## Analysis of #BLM: Purpose, Organization, and Political Reaction

*The Carolinas Conference: Joint Meeting of the North Carolina and South Carolina Political Science Associations, Winthrop University, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: David Howell**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Political Science

(PLSC 507 – Disney)

Black Lives Matter is a social revolution that took the United States by storm, starting with its inception in February 2012. Three women, Alicia Garza, Opal Tometi, and Patrisse Cullors, used proven methods from previous social movements, along with their knowledge from their professional and personal lives, in an effort to bring attention to police violence on African Americans. The unique combination of disruption and organization is not to be dismissed as a factor of Black Lives Matter's success. The shared interests among Black Lives Matter supporters are being executed by the will of the American people, through the most powerful networking opportunity in current history: social media. *The Washington Post* keeps an up-to-date tracker on police violence and shootings on their website. As an effort to support the empirical data for Black Lives Matter, I have calculated several statistics of instances of police violence into percentages based on race, sex, and several other variables. The data show that, as of September 23, 2016, African American males were three times more likely to be killed by police than their white male counterparts. Laws that have been passed by legislatures in recent years prove that there is a need for improvement. The impact of a modern social revolution can change the future for generations to come.

## **“I don’t fit in a box; no one does”: Intersectionality and Gay Male Identity**

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016*

**Student: Jesse L. Grainger, McNair Scholar**

Faculty Mentor: Brent Cagle, Ph.D.

CAS – Department of Social Work

Using an intersectionality framework, this qualitative study explores how stigma affects identity development and how intersecting identities can compound to either foster resiliency or create health concerns for 11 men who are emerging adults (18-29), same sex identified, African American, HIV-positive, and homeless. Semi-structured one-on-one interviews were conducted through RAIN (Regional Aids Interfaith Network) in Charlotte, N.C. Questions were formulated to understand how participants viewed themselves and perceived stigmas, current/past health conditions, and their five to ten year prospects. This study uses grounded theory as a guide to analyze and interpret data. Themes explored include: risks (acquiring HIV through homeless status), biographical disruptions, and self-acceptance as a foundation to resiliency through self-empowerment. All participants in this study displayed resilient behaviors post-diagnosis to present, even those who experienced the worst “biographical disruptions.” Participants all spoke about being survivors of sorts. I found that, for my participants, owning one’s identity created a buffer against the adverse effects of stigma.

## **Rebuilding a Bridge Burned**

*Southeastern Women’s Studies Association (SEWSA) Conference, Winthrop University, March 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Lamonica J. Jones**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Interdisciplinary Studies

(WMST 300 – Disney)

The purpose of this essay is to explore intersectionality and shine a light on the plight of marginalized groups of women. Much too often, women are grouped together in this assumed sisterhood, and people automatically assume that just because we are all women, we are all the same. There are many factors that affect many different women, and the reliance on a common biological make-up alone will not change that. A white woman will not experience the same struggles as a black woman; an upper middle-class woman will not experience the same struggles as a working-class woman; and a biological woman will never experience the same struggles as a transgender woman. Using the feminist anthology edited by Cherrie Moraga and Gloria E. Anzaldúa, *This Bridge Called My Back: Writings by Radical Women of Color*, I attempted to shine that light on those marginalized groups. These personal writings by women from different walks of life give us a window into their lives, an understanding of their struggles, and access to their innermost thoughts and feelings. In a society striving to make women into one-dimensional beings, we must not assist them with one-dimensional thinking.

## **The Impact of NGOs on Poverty in Haiti and Nicaragua**

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Clara R. Kress**

Faculty Mentor: Ginger Williams, Ph.D.

CAS – Department of Interdisciplinary Studies

(IDVS 490 – Williams)

Since the 1980s, non-governmental organizations, or NGOs, have become increasingly prominent in the international-aid sector of civil society in lesser-developed countries, including those in Latin America. While many began as community-driven and grassroots organizations that fought for the empowerment and rights of the masses, their increasing dependence on donor support has caused them to lose much of their roots of advocacy, empowerment, and long-term development work. Their donor dependence has also caused NGOs and aid agencies in general (including charities and nonprofits) to become less transparent and accountable. Haiti and Nicaragua, in particular, are examples of countries in Latin America that have seen shortcomings in the area of international aid in their civil societies. Yet, NGOs and aid agencies are still very important to the civil society of foreign, developing nations and must be amended to return to their original community-driven and grassroots ways, in order to most effectively help the populations they aim to serve.

## **Investigating LPA as an Axon Guidance Molecule in Chick Retinal Ganglion Cells by an Autotaxin siRNA**

*Southeastern Developmental Biology Conference, St. Augustine, Florida, May 2016; South Carolina INBRE Symposium, Columbia, South Carolina, August 2016*

*Supported by grants from the National Eye Institute of the National Institutes of Health and the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Garrett J. Driscoll**

Faculty Mentor: Eric Birgbauer, Ph.D.

CAS – Department of Biology

(BIOL 471 – Birgbauer)

The results of previous *in vitro* experiments indicate that lysophosphatidic acid (LPA) may play an important role in the guidance of retinal ganglion cells (RGCs) across the topographically organized tectum of the chick brain. LPA is produced by the enzyme autotaxin (ATX), which has been found primarily in the midbrain region or boundary of the embryonic chick brain, near the target region for retinal axons, the tectum of the brain. Through viral injection, we targeted non-differentiated, rapidly dividing cells to express our ATX siRNA, therefore depleting the production of LPA. We then labeled retinal ganglion cell (RGC) axons to examine retinal axon guidance to the target, the optic tectum. Preliminary data from light-sheet microscopy and Optical Projection Tomography (OPT) suggest that LPA may play a vital role in the development of the chick visual system.

## The Absence of Disability in Intersectional Feminism

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Sydney Thompson**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Interdisciplinary Studies

Intersectionality has been an incredibly important concept to feminism since it was first introduced by Kimberlé Crenshaw in 1989. Crenshaw used the term to describe the experiences of black women, who are often discriminated against based simultaneously on both their race and their gender. Since then, feminists have used intersectionality to point out that all people lie at the intersection of multiple social identities – race, gender, social class, religion, etc. – and that each of these identities is inseparable from the others. However, when discussing feminism in an intersectional way, the issue of ableism is often forgotten. According to the Institute on Disability, people with disabilities make up 19% of the population. This would make them the largest minority group in the United States, and yet we rarely, if ever, include them in conversations of intersectionality. I argue that we must put forth an effort to make our discussions as inclusive and accessible as possible, to ensure that we do not continue to erase the experiences of people with disabilities. In conclusion, this project, by closely examining feminist literature, sheds new light on the rarely acknowledged issue of the representation of disabled women.

## Orientalism in James Joyce's "Araby"

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Lucas C. Townsend**

Faculty Mentor: Amanda Hiner, Ph.D.

CAS – Department of English

(ENGL 203 – Hiner)

This critical essay analyzes James Joyce's short story "Araby," and the elements of Orientalism (a strain of postcolonial theory) within. While most critics focus on the text's function as a bildungsroman or the narrator's epiphany, few pieces of scholarship exist regarding the overt focus on the Oriental within "Araby." The story's inherent imperial-minded descriptions of an exoticised bazaar are commonly glossed over in these few articles; one cannot pass off the strain of Middle Eastern imagery, characterization, and Othering integrated into the story simply as an attempt to create a place of wonder and mystery. Joyce's Orientalist diction and construction of the story result in the revelation of a latent imperial psychology behind his penmanship. European citizens, despite their best intentions, expose their subliminally indoctrinated colonial agendas through their work, by depicting the fantastical, the magical, or the dangerous as lesser people, objects, or events originating from what Edward Said dubs "The Orient" in his landmark text *Orientalism*. Said's list of what categorizes the Orient fits the narrative of Joyce's "Araby" perfectly, as both romance and anger – basic, primal emotions of the savage places of the Earth – haunt both the Araby bazaar the boy's psyche. This hypocritical way

of viewing millions of people and hundreds of culture groups as both romantic and abhorrent stems from the imperial fascination of white Europeans and Americans from the seventeenth through twentieth centuries, granting them what they believe is the justification to colonize and exploit a "lesser" people.

## Made in the USA with Mexican Parts: The Complexities of Gender, Ethnic Identity, and Skin Color and How They Affect Multiethnic Alliances

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ana Karen Castellanos**

Faculty Mentor: Michael Lipscomb, Ph.D.

CAS – Department of Political Science

(PLSC 553 – Lipscomb)

In her book *No Turning Back: The History of Feminism and the Future of Women*, Estelle B. Freedman asserts that "because of historical, social, national, and personal differences, women cannot assume a sisterhood." In this essay, I will first discuss the complexities of two of the plethora of possible differences, or intersections. I will examine ethnic identities and skin color through the writings of many feminists of color, such as Gloria Anzaldúa, Cherrie Moraga, Nellie Wong, Barbara Cameron, and June Jordan to name a few, who have written on these complicated subjects. Next, I will discuss why these complexities of identity make it difficult for women to simply "assume a sisterhood." Finally, I will discuss who can or cannot assume a sisterhood and what might be necessary to create one. This paper specifically explores women of color living in the United States and the term "sisterhood" respectfully refers to connections between minority women also living in the U.S.

## Do State Whistleblower Laws Reduce Corporate Fraud?

*TRiO McNair Research Symposium, Columbia, South Carolina, June 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Elizabeth Lambert, McNair Scholar**

Faculty Mentor: Adriana Cordis, Ph.D.

CBA – Department of Accounting, Finance, and Economics

We use data collected from the Executive Office for U.S. Attorneys to investigate whether state whistleblower laws have an impact on corporate fraud. For the 18 states whose whistleblower laws have provisions that protect private employees, a higher awareness of whistleblower laws is associated with a lower state-level conviction rate for corporate fraud. This finding is consistent with the hypothesis that whistleblower laws that cover private employees have a deterrent effect on corporate fraud, and that awareness of the laws plays a crucial role in determining their effectiveness as a public policy tool.



## Battling Patriarchy in India: Intersectional Women's Movements?

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016*

**Student: McKenzie E. Workman**

Faculty Mentor: Jennifer Disney, Ph.D.

CAS – Department of Interdisciplinary Studies

(WMST 337/PLSC 337 – Disney)

In a country plagued by the nuances of patriarchal culture, Indian women have risen to the challenge of fighting for and claiming their own rights. The increase in women's activism is not only beneficial, but also necessary, as the laws that have been written in order to help women have been largely ignored, and are therefore often useless in the face of the difficulties that women suffer. It is very important to consider the differences among and between women in India, and the extent to which these differences have been incorporated into Indian women's movements and Indian feminisms, including differences such as the caste system, class, the LGBTQIA+ community, and religion. In other words, I will examine the extent to which Indian women's movements have been intersectional. Primarily, I will focus on the questions surrounding the practice of sati, violence against women, the strengths and weaknesses of women's organizing, the history of feminism and women's organizations in India, and the implications of western interpretations of Indian culture and feminisms. It is crucial to understand the Indian perspective on these issues, as a western interpretation may be limited in its understanding of the matters at hand. It is also crucial to understand that feminism fights for more than just strategic interests for women; it also fights for a person's right to basic survival needs, issues that will also be properly addressed.

## A Novel Use of 3D-Printing Demonstrates Structural Effects of Osteoporosis on Cancellous Bone Stiffness and Strength

*Southern Regional Honors Conference, Asheville, North Carolina, April 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE) and the Winthrop University Research Council*

**Student: Margaret Arielle Black**

Faculty Mentor: Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

Previously, we performed a study using a 3D-printer to test the effect of cancellous bone deterioration on tissue strength and stiffness. In this study, 3D-printing enabled, for the first time, accurate mechanical testing of the same cancellous structure in both healthy and osteoporotic states. Our results demonstrated a 20% decrease in stiffness and a 24% decrease in strength in the osteoporotic structure. Our current study aims to confirm that the 3D material (VisiJet FTX green resin) achieves constant material stiffness in repeated printings, and that the 3D printer

(ProJet 1200) is capable of accurately printing trabecular bone samples in real size. Sixty 3D-printed cubes were cropped and segmented (Amira6.0) from a chimpanzee's metacarpal head micro-CT scan. Thirty of the cubes were identical to the original scan and thirty were the same structure after osteoporosis was simulated (10% loss of bone tissue). Results demonstrated that Young's modulus values (i.e., material stiffness) for the healthy and osteoporotic models were not significantly different ( $171.0 \pm 41.1$  versus  $169.3 \pm 40.6$  MPa;  $p > 0.05$ ). These results confirmed that the 3D-material achieves constant stiffness in repeated printings. Thus, any difference between the models is due to structural, not material differences. Thirty-six 3D-printed cubes ranging in size from 4.5 to 21 mm (in increments of 1.5 mm) were analyzed by calculating the predicted volume (i.e., bone pixels; Amira 6.0) and measuring actual weight. In a scatterplot, this demonstrated a strong correlation ( $R^2 = 0.9997$ ), indicating that our 3D-printer is capable of accurately printing realistic replicas of the original structure. This study demonstrates that 3D-printing is a novel tool for testing cancellous structures in order to estimate their mechanical properties.

## Synthesis of Small Molecules for Inhibiting Aggregation of Alzheimer's Amyloid- $\beta$ Peptide

*68th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Columbia, South Carolina, October 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Excellence (NIH-INBRE)*

**Students: Jake Roberts and Benjamin P. Hernandez**

Faculty Mentors: James M. Hanna Jr., Ph.D., and Robin K. Lammi, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Amyloid- $\beta$  peptide (A $\beta$ ) self-assembles into neurotoxic,  $\beta$ -structured aggregates, which are the primary component of the extracellular senile plaques characteristic of Alzheimer's disease. A variety of small molecules have been shown to inhibit the aggregation process; typically, these contain aromatic groups and one or more hydrogen-bond donors to enable binding to A $\beta$ . We previously demonstrated that 3,3',4,4'-biphenyltetrol (3,4-BPT) effectively abrogates A $\beta$  aggregation at stoichiometric concentrations. To further investigate this molecular architecture and determine how the positioning of the hydroxyl hydrogen-bond donors impacts inhibitor efficacy, we also synthesized four additional symmetrical biphenyltetrols (2,3-, 2,4- 2,5- and 3,5-BPT). However, 2,2',6,6'-tetramethoxybiphenyl, the intermediate for 2,6-BPT, eluded synthesis using our standard Suzuki-coupling chemistry, presumably due to significant steric hindrance in the coupling partners. This limitation was overcome by employing a catalyst comprised of Pd<sub>2</sub>(dba)<sub>3</sub> and the bulky phosphine ligand 2-diphenylphosphino-2'-(N,N-dimethylamino)biphenyl; 2,2',6,6'-tetramethoxybiphenyl was thus obtained in 60% yield. Demethylation with BBr<sub>3</sub> afforded a 72% yield of the desired 2,6-BPT. To expand our investigation into the inhibitory efficacy of biaryls containing multiple hydroxy groups, 4-(3-pyridyl)catechol was synthesized via a Suzuki coupling/demethylation protocol. 3-(3,4-Dimethoxyphenyl)pyridine was synthesized in 76% yield from 3-pyridylboronic acid and 4-bromoveratrole using PdCl<sub>2</sub>(dppf) as the catalyst; demethylation with BBr<sub>3</sub> produced the desired 4-(3-pyridyl)catechol.



## Power and Position: Exploring the Historical Role of First Lady through the Lens of Modern Chinese History

*Southeastern Women's Studies Association (SEWSA) Conference, Winthrop University, March 2016*

**Student: Andrew McIver**

Faculty Mentor: Catherine Chang, Ph.D.

CAS – Department of History

(HIST 554 – Chang)

Because the wives of male leaders figure so prominently into the 20th and 21st centuries, the role of First Lady provides a place to explore modern constructs of female power and agency, and perhaps more importantly, the way that female exercise of power is viewed by the public. Yet, very little research has emphasized this uniquely gendered exercise of power, and what little scholarship has been conducted is primarily situated on the historical role of American First Ladies. I place my research at the intersection of modern Chinese history and contemporary women's studies, and through a survey of newspapers, interviews, comics, and biographies, I explore the role of First Lady in the context of Chinese history and the ways in which the images of First Ladies, particularly Madame Chiang Kai-shek, shifted as the public began to criticize powerful women more heavily than their similarly powerful husbands. Outward from this gendered discrimination radiated a powerful and still resonant stereotype, the Dragon Ladies of Asia. In light of the diminished role of First Ladies in contemporary Asian politics, I argue that we must upend the gendered conversations surrounding power and question the images, metaphors, and language that we use to describe it.

## Experiences of Hispanic Women Navigating the Healthcare System in Rural South Carolina

*National Conference on Undergraduate Research (NCUR), University of Memphis, April 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Krista Parenti**

Faculty Mentor: Monique Constance-Huggins, Ph.D.

CAS – Department of Social Work

(SCWK 473 – Constance-Huggins)

Hispanics represent one of the fastest growing minority populations in the United States. Yet their health outcomes are among the worse in the nation. Access to care is one of the biggest reasons for their poor health outcomes. While there has been increasing attention on the experiences of Hispanics accessing healthcare, little is known about the specific experiences of women, particularly those in rural communities. This qualitative study attempts to fill this gap by exploring the experiences of eight rural Hispanic women accessing healthcare in rural South Carolina. The study used a semi-structured interview guide. Results showed that rural Hispanic women face an intersection of structural barriers – race, low economic status, and rurality – when accessing healthcare. The intersection of these factors signals the need for targeted programs and policies to address these structural barriers to care for rural Hispanic women.

## Mindfulness, Task Engagement, and Divergent Thinking

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Shelby McCallister**

Faculty Mentor: Donna Nelson, Ph.D.

CAS – Department of Psychology

(PSYC 471 – Sleight)

In recent years, there has been growing interest in the application of meditation practices to promote positive outcomes in higher education. Mindfulness is a form of meditation that emphasizes focus and attention to the present moment. We conducted an experiment to determine whether a mindfulness intervention could improve college student task engagement and performance on tests of divergent thinking. We randomly assigned fifty-four undergraduates to a *control condition* or a *mindfulness condition* that taught them to orient attention and focus on the present moment. They then completed measures to assess their level of engagement during a test of divergent thinking. Our process for assessing divergent thinking was modeled after that used by Silvia et. al. (2008). Participants generated creative uses for a brick, creative instances of things that are round and creative imagined consequences of people no longer needing to sleep. Analyses revealed that those in the *mindfulness condition* exhibited greater divergent thinking ( $M = 3.58$ ,  $SD = 0.39$ ,  $n = 29$ ), compared to those in the *control condition* ( $M = 2.66$ ,  $SD = 0.41$ ,  $n = 22$ ),  $t(49) = -7.95$ ,  $p < 0.001$ . Furthermore, reports of task engagement were higher in the *mindfulness condition* ( $M = 3.70$ ,  $SD = 0.68$ ,  $n = 32$ ), compared to the *control condition* ( $M = 3.21$ ,  $SD = 0.72$ ,  $n = 23$ ),  $t(53) = -2.55$ ,  $p < 0.01$ . Our findings indicate that brief sessions of mindful meditation can be leveraged to promote creativity and enhance focus and task engagement.

## Implementing Resilience in Children of a Low Socio-Economic Status

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; Inclusion Conference, Winthrop University, November 2016; Annual SCCEC Professional Development Conference, Myrtle Beach, South Carolina, February 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Alexis Williamson, McNair Scholar**

Faculty Mentor: Bradley Witzel, Ed.D.

COE – Department of Counseling, Leadership, and Educational Studies

There are millions of children living in poverty. Unfortunately, many will continue living in the vicious cycle of generational poverty. Resiliency allows these children to positively adapt to their adversity. This study is looking at implementing resilience in children of a low socio-economic status. A mixed-methods methodology was implemented in order to figure out whether or not resiliency can be instilled using strategies formed within a previous study. Based on the post-assessment and qualitative interviews, the collective strategies did not lead to a significant increase in resiliency. However, interviews revealed changes in individual students' classroom behavior indicating functional resiliency.

## Visible Light-Promoted Additions of Potassium Organotrifluoroborates to Imines

*68th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Columbia, South Carolina, October 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Christopher J. Jordan**

Faculty Mentor: James M. Hanna Jr., Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Recently, the use of visible light combined with a suitable photocatalyst to promote key bond-forming steps in organic synthesis has emerged as a viable strategy to achieve a number of important synthetic transformations. Visible light passes through ordinary glass, and organic substrates do not typically absorb wavelengths in the visible range, providing a significant advantage of this method over traditional ultraviolet (UV) photochemistry. The photocatalyst involved is often a ruthenium or iridium polypyridyl complex, which absorbs light in the visible range to give a relatively long-lived excited state. This photo-excited catalyst then mediates the formation of radicals from organic substrates, through a series of single-electron-transfer (SET) events; the organic radicals thus generated engage in downstream reactions, leading to the final product(s). We have begun exploring this strategy as a means to effect formal additions of potassium organotrifluoroborates to imines. We have found that irradiation of an argon-sparged dichloromethane solution of potassium benzyltrifluoroborate, benzalaniline, and diphenylphosphate in the presence of *Ir-dF(CF<sub>3</sub>)-dtb* at room temperature using blue LEDs (450 nm) yielded the expected addition product in 76% isolated yield; only traces of homocoupling products could be detected. Control experiments established that catalyst and light are both required for reaction; the elimination of diphenylphosphate led to a slightly lower yield. Light/dark experiments seemed to favor a single-cycle mechanism rather than a radical-chain mechanism.

## Exercise Therapy for Complex Regional Pain Syndrome

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Amber Leeann Young**

Faculty Mentor: Janet Wojcik, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(EXSC 511 – Wojcik)

Complex Regional Pain Syndrome (CRPS), or Reflex Sympathetic Dystrophy (RSD), is a chronic nervous system disorder that negatively affects mobilization and daily living activities. CRPS is characterized by intense pain, temperature and skin changes for the affected area, hypersensitivity, swelling, excessive sweating, impairment of motor functions, weakness, and decreased range of motion. Various treatment approaches exist to treat CRPS and the pain associated with it, including aerobic exercise, physical therapy, whirlpool bath, and neuromuscular electrical stimulation. A sample case study examines the combination of various treatment methods to treat CRPS and provides a typical therapy prescription.

## Enron and Sarbanes-Oxley: The Status of Former Enron Employees and the Impact of Sarbanes-Oxley on Accounting in the United States

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Nicholas A. Cunningham**

Faculty Mentor: Marilyn Smith, Ph.D.

CBA – Department of Management and Marketing

(MGMT 575H – Smith)

This research paper discusses two distinct topics: Enron and the Sarbanes-Oxley Act of 2002. Specifically, it outlines the current status of former Enron employees as well as the impact that Sarbanes-Oxley had on accounting in the United States. The research reviews several of the key individuals involved in the Enron scandal as well as others who are less well known. Additionally, the research analyzes how Sarbanes-Oxley has impacted the areas of auditing, internal control and compliance, as well as the various impacts it has had on bankruptcies and fraud many of, which have not always resulted in improved practices. Finally, the research discusses whether or not Sarbanes-Oxley has truly achieved its goal of instilling ethical accounting practices in corporate America.

## The Mechanical Properties of Mice Tibial Mid-Diaphysis is Sex and Age Independent

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Jack Nguyen**

Faculty Mentor: Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

Bone is a classified organ that continuously undergoes modeling based on the load it experiences. The aim of this study was to examine these changes in the cortical bone of male and female mice across two age groups. In order to do this, twenty-five sections of the mid-diaphysis were cut from the tibiae of eight male and seventeen female mice. Bones from both sexes were then categorized as either "old" or "young," depending on their age (up to 2 months for young and older than 3 months for old). These cortical samples were then loaded in compression using an Instron 5942 universal testing machine, in order to determine (1) whether or not there was any significant difference in the material and structural properties of male versus female cortical bone and (2) if these differences had any correlation with the age of the mice. All samples were loaded until fracture and a stress-strain curve was generated, from which the values for stiffness, strength, and Young's Moduli were obtained. The average stiffness was  $1058.4 \pm 487.2$  N/m versus  $855 \pm 342$  N/m; the average Young's Modulus was  $529.3 \pm 243.8$  MPa versus  $427.5 \pm 170.9$  MPa; and the average strength was  $12.9 \pm 4.6$  MPa versus  $11.3 \pm 4.6$  MPa for the young and old samples, respectively. Our results imply that the mechanical properties of mice tibial mid-diaphysis does not differ between male and female and does not change with age. These results could be due to the low bodyweight of mice and the low stresses their bones experience, leading to low modeling activity.

## Americanized Arthurian Animation: Political Propaganda Publications in Children's Cinematic Cartoons

*11th Annual Meeting in the Middle, Longwood University, April 2017;  
Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: John Kroft**

Faculty Mentor: Jo Koster, Ph.D.

CAS – Department of English

(ENGL 307 – Koster)

The Arthurian tradition begins as a backhanded compliment, and through the course of a multitude of generations to follow, the story expands into a literary titan. Names such as Guenever, Lancelot, and Arthur are names that people are familiar with even if they have not read works by T.H. White, Sir Thomas Malory, or Chretien de Troyes, in part thanks to Walt Disney. Some critics suggest that Walt Disney's 1963 film *The Sword in the Stone* has no place in a college-level course because it is childish. This is precisely why it has a valid place in an Arthurian literature or film class; Disney's rendition of the tale provides a positive message to children while simultaneously sending a far more mature message of understanding social issues to the adult viewers. In this film, T.H. White's novel, *The Sword in the Stone*, is adapted to the screen and marketed for a younger audience, encouraging children to embrace good morals and education. This piece also acts as pro-American propaganda during the Cold War shortly after Kennedy's death. Though possibly coincidental, this Cold War Camelot acts as a social mirror for events occurring and world leaders in power during the time of the film's release. Regardless of box-office success, this retelling of the story of King Arthur is as equally successful and credible as any other historic text regarding Arthur.

## The Variability of Cortical Bone Stiffness along the Femur Shaft

*National Conference on Undergraduate Research (NCUR), University of Memphis, April 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Jack Nguyen**

Faculty Mentor: Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

Cortical bone is a calcified connective tissue that comprises the rigid outer portion of bones. For this study, we examined the stiffness of this material in its three orthogonal directions (axial, radial, and transverse) in three locations along the femurs of white-tailed deer (proximal, mid-diaphysis, and distal). Based on Wolff's law of bone adaptation, we would expect to observe higher values of stiffness in areas that experience the most loading (e.g., mid-diaphysis, axial direction; assuming the bone is loaded in bending). Therefore, our working hypotheses for this study were that (1) bone samples will have the highest stiffness when loaded in the axial direction (the direction of physiological loading), and that (2) mid-diaphyseal samples would have the highest stiffness when compared to samples from the proximal and distal femur. To test these hypotheses, ninety cubical samples (2 mm<sup>3</sup>

in volume) were prepared using a low-speed diamond saw. These cubes were then tested in compression using an Instron 5942 universal testing machine. Tests were repeated a total of three times for each orthogonal direction. Stiffness values were significantly higher in the axial direction (compared to the radial and transverse directions) in all locations (proximal, mid-diaphysis and distal femur), thus supporting our first hypothesis. These results are consistent with Wolff's Law, since the axial direction, which normally experiences the most loading in the femur, showed the highest stiffness values. Our results also demonstrated a statistically significant difference in the radial and transverse directions for stiffness of the mid-diaphysis (but not the axial direction), thus refuting our second hypothesis. These similar stiffness values in the axial direction may imply that, due to muscle action, the femur is not loaded in bending but almost pure compression.

## Visible Light-Promoted Additions of Potassium Organotrifluoroborates to Carbonyl Compounds

*68th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Columbia, South Carolina, October 2016*

*Supported by a grant from National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student: Davis P. Plasko**

Faculty Mentor: James M. Hanna Jr., Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Recently, the use of visible light combined with a suitable photocatalyst to promote key bond-forming steps in organic synthesis has emerged as a viable strategy to achieve a number of important synthetic transformations. Visible light passes through ordinary glass, and organic substrates do not typically absorb wavelengths in the visible range, an advantage over traditional UV photochemistry. The photocatalyst involved is often a ruthenium or iridium polypyridyl complex, which absorbs light in the visible range to give a relatively long-lived excited state. This photo-excited catalyst then mediates the formation of radicals from organic substrates, through a series of single-electron-transfer (SET) events; the organic radicals thus generated engage in downstream reactions, leading to the final product(s). We have begun exploring this strategy as a means to effect formal additions of potassium organotrifluoroborates to carbonyl compounds. We have found that irradiation of an argon-sparged dioxane solution of potassium benzyltrifluoroborate, benzaldehyde and diphenylphosphate in the presence of *Ir-dF(CF<sub>3</sub>)-dtb* (2.5 mol%) at room temperature using blue LED floodlights (450 nm) resulted in the formation of 1,2-diphenylethanol in 35% yield; homocoupling products bibenzyl and an organoborate derived from reaction of 1,2-diphenyl-1,2-diol with potassium benzyltrifluoroborate were also detected. Control experiments established that light, catalyst, and diphenylphosphate are all required for reaction success. Use of dichloromethane as the solvent resulted in a 48% yield of 1,2-diphenylethanol. In this presentation, we will discuss the development, optimization, and preliminary scope of this protocol.

## Contemporary Black Women Artists' Narratives

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; South Carolina Art Education Conference, Greenville, South Carolina, November 2016*

**Student: Shannon Snelgrove, McNair Scholar**

Faculty Mentor: Laura Gardner, Ph.D.

CVPA – Department of Fine Arts

The purpose of this study is to explore contemporary Black women visual artists' experiences in the arts. Specific experiences studied include finding support, balancing family responsibilities, and overcoming gender and race barriers. Though there are numerous articles on Black women's artwork, there are few about their lived experiences, in their own words. To address this gap, semi-structured interviews were conducted with Black women visual artists from the Southeastern United States. Despite its focus on a particular group, the study speaks to diverse audiences about surmounting challenges in life and work. Two interviews have been conducted so far, and preliminary results show common themes. These themes include family support for art-making and family participation in art-making, mentorship and helpful connections with other Black professionals, strategic navigation around gender and race barriers, culture as an important theme in their work, and an integrated relationship between their academic professions and their artistic work. These results are clearly not conclusive nor generalizable but may provide leads for future investigation. The results might also provide helpful information and guidance to emerging Black women artists. Both artists interviewed affirmed the importance of learning from more experienced artists, and this study can serve that end.

## The Effect of Biased Presentations on Perceptions of Citizen-Police Interactions

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Students: Amber Laine Stroud, Asia Nicole Draper, and Jessica Janai' McMillan**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Research has demonstrated media bias in presentations of political views, public opinion, poverty, crime, gender, and environmental issues. Because the presentation of information influences consumers, biased presentations often lead to biased perceptions and opinions. The current study focused specifically on the effect of biased information (formatted like popular media) on readers' perceptions of citizen-police interactions. Participants ( $n = 102$ ) were randomly assigned one of two surveys. Multiple scenarios were counterbalanced on the two versions, with some scenarios using positive wording or positive user comments to describe citizen-police

interactions, and other scenarios using negative wording or comments to describe interactions. Our manipulations were relatively subtle, and yet they resulted in dramatically different perceptions. As hypothesized, participants exposed to the more positive wording reported more positive perceptions of the police officer than did adults exposed to the negative wording. Our manipulated user comments were focused specifically on the behavior and role of the police officer, and yet they influenced perceptions of both the police officer and the citizen in the scenario; this finding suggests that biased information may have broad effects. Our study also revealed that political affiliation predicted preferred news sources, raising the question of whether people seek information that supports their beliefs or if beliefs are created based on presented information. In a society where news coverage is a 24-hour business, an enhanced understanding of the media's power is useful to both producers and consumers.

## The Impact of Public Declarations on Relationship Satisfaction

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Madison Busch, Jasmyn Acree, and Anne Marie Maghakian**

Faculty Mentor: Matthew Hayes, Ph.D.

CAS – Department of Psychology

College students increasingly use online social networking sites (SNS) in their romantic relationships. Research on Facebook has shown positive and negative effects, but the impact of newer SNS on relationships is unknown. The current study explored how online communication related to college students' satisfaction in romantic relationships. Sixty-four college students (55 women) completed an anonymous online survey about SNS use – frequency and Social Media Activity (e.g., posting pictures, displaying relationship status) for Facebook and Instagram – and relationship satisfaction. However, neither Social Media Frequency nor Social Media Activity was significantly correlated with Relationship Satisfaction. Reciprocity – the degree of back-and-forth communication between participants and their significant others – was examined. All ten reciprocal behaviors were significant, e.g., the relationship between posting on significant other's wall and significant other's liking the participant's photos. Overall, the results indicate that the type of SNS used, the type of features used, and the frequency of use were unrelated to relationship satisfaction; however, there was significant evidence for ongoing reciprocal communication between the relationship partners. Future research should not just focus on one member of the relationship; doing so will miss aspects of the couple's interaction. This study challenges the idea that people are going online to be more anonymous and suggests that people go online to share more about their relationships. This means that instead of desiring relationships to be private, today's young people desire to share their romantic relationships more widely using social media.



## Gender Socialization: How Gender Norms Affect the Partaking of Help-Seeking Behaviors

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Jayma L. Goodwin, Aaron Howell, Aerial Brunson, and Cady Bartle**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

Due to gender stereotypes, men are thought to refuse help even though it is available. The goal of this research was to find if gender did in fact play a significant role in a person seeking help from family, friends, and professionals. We predicted that men were less likely to participate in help-seeking behaviors. Our participants ranged from college students to friends on Facebook and included 45 women and 30 men. They completed an online survey that combined the Attitudes Towards Seeking Professional Psychological Help: A Shortened Form (ATSPPH- SF), the Barriers to Help Seeking Scale (BHSS), the Conformity to Masculine Gender Norms Inventory (CMNI) and the Academic Emotion Regulation Questionnaire (AERQ). Our results partially supported our hypothesis. The results showed that there was no significant relationship between gender and help-seeking behavior. They did, however, show that there was a significant negative relationship between attitudes towards seeking professional psychological help and conformity to masculine gender norms, as well as a significant positive relationship between barriers to help-seeking and conformity to masculine gender norms. Also, our results showed that women had significantly better attitudes toward seeking professional psychological help than men. These findings add to previous research that masculinity might help in predicating help-seeking behavior. These findings also contradict previous research that gender is related to help-seeking behavior. Future research should look further into gender and masculinity in relation to help-seeking behaviors.

## Women's Body Shapes and Perceptions of Their Career Competency

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Student: Paige Kisker**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

Body dissatisfaction is common in today's society, especially for women. A mixed societal message exists where women tend to be less self-critical as they age, but also feel increasingly invisible. Overweight women are particularly vulnerable to compromised psychological health and career underachievement as they age, partially because of harsh judgment by others. We examined adults' perceptions of women's body shapes and their career competency. We hypothesized that heavy female body types would be associated with the most negative perceptions. We also hypothesized that an average frame would predict the most positive attitudes toward female politicians. Participants ( $n = 267$ ) were falsely informed that researchers had linked particular body types with success in specific careers. Participants were presented with three body silhouettes and asked to guess what the researchers had found. Next, participants were

presented with photographs of female politicians with varying body shapes and asked to indicate whether the politician's body had helped or hurt her political ambitions. Participants responded to the Body Party Satisfaction Scale. Results revealed that people believed that body shape affects career success. Being heavy was perceived as harmful to female politicians. Personal body dissatisfaction and being a woman led to more harsh judgments toward overweight politicians. An emphasis on stereotypically desirable female features was associated with harsher judgments toward female leaders and overweight women. These findings illustrate that perceptions of women's competency reflect characteristics of the woman and the perceiver.

## Exploring Variables in Aqueous Synthesis of Zinc Oxide Nanoparticles

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2016; Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

*Supported by a grant from the Winthrop University Research Council*

**Student: Jessica Stevens**

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Zinc oxide is commonly found in sunblock and antibacterial creams. For these technologies and many others, the habit and size of crystals, connected to their surface properties, are important to be able to reproducibly synthesize. This research is an extension of previous work using ethanol as a solvent, with the eventual goal of bacterial remediation. While previous studies used zinc sulfate and zinc acetate reactants, zinc chloride was used here. This exploratory research examined many variables: zinc molarities (0.005-0.05), sodium hydroxide molarities (0.05-0.5), presence or absence of guar gum, and time for mixing were all altered in a controlled fashion. The passivating agent, guar gum, was included to inhibit growth, limiting particle size. X-ray diffraction and particle size data were collected on prepared samples. Analysis showed consistent synthesis of zinc oxide, but none of the trials resulted in nanoparticles; smallest sizes were on the order of 1-3  $\mu\text{m}$ , and typical sample size averages were 25-50  $\mu\text{m}$ . Measured pH, dependent on sodium hydroxide amount, showed no correlation to particle size, but smaller particle sizes tended to favor lower molarities of both zinc chloride and sodium hydroxide. In addition, warmer temperatures (room temperature versus  $\approx 70^\circ\text{C}$ ) led to larger particle sizes; thereafter, experimentation was restricted to room temperature. Exploratory synthesis with water has enabled the development of fundamental knowledge for growth from aqueous solutions, and the potential ability to use inexpensive, abundant water as a solvent for useful materials.



## Socio-Cognitive Orientation and Engagement: Evaluating Indicators of Academic Achievement

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Bridget Tallent, Angelina Capozzola, Alice Da Nobrega Garcia, and Jai Jackson**

Faculty Mentor: Jeffrey Sinn, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sinn)

Social class, as determined by access to resources and cognitive advantages, produces socio-cognitive tendencies. Upper-class individuals enjoy freedom and opportunity that foster solipsistic tendencies (i.e., a focus on individual goals), whereas lower-class individuals face social constraints that produce contextualist tendencies (i.e., a focus on external support). Given that social class affects academic performance, the present study sought to discover the connection between the solipsistic tendency of upper classes and academic engagement through the following hypotheses:

(1) students with a higher socioeconomic status will indicate higher levels of engagement in all three dimensions (affective, cognitive, and behavioral); (2) students with higher self-control and perceived sense of control over GPA will have higher engagement; and (3) students with higher socioeconomic status will have higher reported GPA. Sixty participants from psychology classes were recruited for use in this study. The results did not support our first hypothesis, as there was no significant correlation between socioeconomic status and the three dimensions of engagement. Our second hypothesis was marginally supported, as sense of control over GPA significantly correlated with the cognitive aspect of student engagement,  $r(57) = 0.384, p = 0.007$ , and the behavioral aspect,  $r(57) = 0.494, p < 0.001$ . There was no support for our third hypothesis, though an incidental correlation appeared between behavioral engagement as it predicted actual GPA,  $r(57) = 0.336, p = 0.009$ . We concluded that no relationship exists between social class and student engagement via socioeconomic status.

## Young Adults' Emotional Intelligence and Emotional Reliance on Social Media

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Kaitlin Cobb, Kristen A. Johnson, Deborah Feldman, Emily Whitehead, and Vivian Segnini**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Zhao, Kong, and Wang (2013) demonstrated that higher emotional IQ was associated with higher levels of social support. Social media is one way that young adults find social support. We combined these different research streams by examining emotional IQ and its relationship to emotional reliance on social media.

We focused specifically on Facebook and Snapchat as these are popular social media outlets. Facebook affords lengthier and longer-lasting communication, while Snapchat is a quick and temporary communication venue. We hypothesized that a higher emotional IQ would predict more intense Facebook use, because of the greater social support created by Facebook. We hypothesized that emotional IQ would be negatively correlated with Snapchat use, because of its lower opportunities for long-term social connectivity. Participants ( $n = 84$ ) completed the Schutte Self Report Inventory (SSRI), which assessed emotional IQ. The Social Media Integration Scale was used to measure attitudes towards social media, and the Bergen Addiction Scale was used to measure addictive behavior on social media. The higher the emotional IQ score, the higher the Facebook Addiction score and the more time participants spent on Facebook. Emotional IQ did not predict Snapchat attitudes or addictive behaviors. Adults who were addicted to one outlet were also addicted to the other. These data support the conclusion that social media, often criticized for its impersonal nature, does not have a detrimental effect on young adults' emotional IQ.

## Accuracy of Fitness Trackers

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Nicole Beatson**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

This research involves the latest fad in physical activity, which is fitness trackers. The main goal of this research is to prove the accuracy of various types of fitness trackers, such as Fitbits, Apple Watches, Jawbones, Withings, and other types of trackers. The purpose is to ensure the accuracy of fitness trackers, not just during physical activity, but also throughout an entire day. Fitness trackers measure steps, energy expenditure, calorimetry, heart rate, distance, sleep, and flights of stairs taken. These are a lot of complex measurements that are made by these devices. There are many studies that try to measure device accuracy in each category, and there are also a lot of studies that compare different kinds of fitness trackers to see which one is most accurate. Some seem to be more accurate in certain areas than others. Each brand of fitness tracker comes out with a new and improved version all the time to keep up with the research. There is much research on comparing different fitness trackers to one another and there are trends throughout the research. From what research portrays, the Fitbit Ultra is the most accurate when it comes to measuring steps. In a particular study, one party wore the Fitbit Ultra, and another wore Jawbone as both pursued their regular activities for an entire day. The Jawbone calculated many false positives when the person would be washing dishes, or performing some sort of arm movement. My interpretation of this research so far is that Fitbits seem to be the most accurate, and the most widely used fitness trackers.

## Moral Foundations Theory Predicts Support for 2016 Presidential Candidates: The Importance of Fairness

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Jalen Smith, Montrice Chisolm, and Jenna Smoak**

Faculty Mentor: Jeffrey Sinn, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sinn)

Moral Foundations Theory (MFT) suggests liberals endorse only “individualizing” foundations (harm and fairness) and conservatives endorse these plus “binding” foundations. MFT argues that liberals and conservatives endorse individualism equally. We hypothesized that binding foundations and individualizing foundations predict support for Trump. We predicted individualizing foundations would also predict Trump support given the anti-establishment and anti-(illegal) immigration tenor of the campaign. 98 college students received course credit to complete the survey prior to the 2016 election. The sample included 98 people averaging 20.06 years. Respondents completed sub-scales of the Moral Foundations Questionnaire, a measure of political party identification strength, a self-reported measure of socioeconomic status, and item measures of support for both Trump and Clinton as candidates. Multiple regression analyses tested predictors of support for Donald Trump. The model was significant,  $R^2 = 0.333$ ,  $F(7,90) = 6.428$ ,  $p < 0.001$ . One moral foundation, fairness, was a significant negative predictor,  $\beta = -0.388$ ,  $t(90) = -2.799$ ,  $p = 0.006$ . Fairness was a significant positive predictor,  $\beta = 0.380$ ,  $t(90) = 2.643$ ,  $p = 0.010$ . Party identification was significant,  $\beta = 0.510$ ,  $t(90) = 4.989$ ,  $p < 0.001$ . The predictor power of fairness, negative for Trump and positive for Clinton, suggests the critical importance of SDO in explaining voting in this election cycle. Trump voters may be opposed to equality and support group-based dominance as a means to protect their place in society. Limitations of the study were that three-quarters of the sample were females.

## Number of Siblings and Quality of Adult Relationships

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: LaShelle Tynes, Leah Price, and Malik Williams**

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleigh)

Sibling relationships are likely to be the longest lasting in an individual's lifetime and thus have lifelong impact. A prevailing theory is that the more siblings in a family, the more resources are diluted, resulting in less energy, time, and money for each child. For example, number of siblings predicts obesity in childhood, less educational achievement, and reduced frequency of maternal interaction. We also examined number of siblings; however, we were interested in whether there might be beneficial aspects to larger families, such as social skill development, rather than

simply resource dilution. Participants ( $n = 91$ ) responded to the Sibling Relationship Questionnaire-Revised, the Intimate Friendship Scale, the (romantic) Relationship Assessment Scale, and questions to assess family structure. Contrary to our expectations, the data suggest that number of siblings is not an influential variable in predicting later relationships. Perhaps social skill development is as possible with one sibling as with many, or perhaps the sibling relationships are distinct enough from romances and friendships as to be relatively irrelevant to the quality of those relationships. Family size was not completely meaningless. The number and gender of siblings did affect quality of relationships with parents, suggesting that siblings have a more immediate, rather than long-term, impact on relationships. Number and gender of siblings also impacted adults' nurturing tendencies, raising the possibility that sibling relationships might affect how adults parent their own children.

## Perceptions of Aggression in Male and Female Athletes and Non-Athletes

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2017*

**Students: Olivia Costello and Leah Young**

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleigh)

Athletes report higher levels of aggression than non-athletes across cultures. Male and female athletes display similar levels of aggression during sports competitions; however, female athletes rate aggression as less appropriate in sports events and tend to apologize for aggressive actions. The purpose of the current study was to combine and update previous research by examining perceptions of aggression across male and female athletes and non-athletes. Participants ( $n = 90$ ) were equally divided between Division One college athletes and non-athletes attending the same university. Participants were first asked to read eight researcher-created scenarios that differed in level of aggression. In each situation, a main character was described as engaging in some form of aggression. Participants indicated how aggressive and appropriate the behavior of the main character was and then responded to the “Aggression Questionnaire.” Our results revealed that gender was a powerful predictor of aggression. Men reported more overall aggression than women, and male athletes were more physically aggressive than female athletes. However, we did not find a gender difference in overall aggression when we examined athletes only. Female athletes found the aggression depicted in our scenarios as less appropriate than did male athletes, suggesting the possibility that female athletes might be reinforced for behaving a way that they simultaneously perceive as inappropriate. Our data suggest that differences seen in previous research still hold true in 2016.

## The Relationship Between Realization of Same-Sex Attractions and Involvement in the LGBTQ Community

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Student: Destiny Farrell**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

Perceptions of choice related to bisexuality and gender identity contradict the argument that sexual orientation is static at an early age, which may lead to the exclusion of these individuals within the LGBTQ community. In this study, we hypothesized that an earlier age of realizing same-sex attractions would increase the likelihood of involvement in LGBTQ groups. Participation was solicited through social media and fliers. The criteria for eligibility were identify as female, be 18 years old or older, have enduring (i.e., continuing/long-lasting) attractions to men and women. The final sample included 54 women who indicated their involvement in LGBTQ groups and the age at which they became aware of, acted upon, and told others about their same-sex attractions. A Pearson correlation was conducted to analyze the correlations between these variables and group involvement. We found significant negative correlations between involvement in LGBTQ groups and the age of awareness, acting upon, and telling others about attractions to same-sex individuals. In other words, greater involvement of participants in LGBTQ groups was related to younger ages. We conclude that we were correct in our hypothesis that a younger age of awareness of same-sex attractions leads to individuals having greater involvement in LGBTQ groups. An earlier age of realization of same-sex attractions supports the LGBTQ community's argument that sexual orientation is fixed, not a decision. Therefore, individuals with same- and other-sex attractions may feel more connected to the LGBTQ community if their same-sex attractions are identified at an earlier age.

## Mindfulness, Optimism, and Political Ideology Affect Perceptions of Being Stereotyped

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Student: Claudia A. Salazar, McNair Scholar**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

Stereotypes are associated with a multitude of negative consequences for the stereotyped individual, including anxiety, incorrect perceptions, diminished performance, and reduced focus. Recently, researchers have demonstrated that positive outcomes of stereotyping are also possible. We examined whether characteristics of the stereotyped individual influence responses to these positive outcome situations. Participants ( $n = 161$ ) responded to the Mindfulness Scale, the Subjective Happiness Scale, the Life Orientation Test-Revised Scale, and the Resilience Scale. Next, participants were asked to describe a situation in which they were stereotyped and felt that something *positive* resulted. Results revealed

that stereotyping can result in positive outcomes, and participants were willing to provide specific, personal examples. Personality characteristics and political ideology emerged as more influential in determining individual responses than demographic characteristics. This pattern is different from the research on *negative outcome* stereotyping where race and gender matter greatly. Our participants seemed unaware of how influential personality was. When we asked them what factor was most influential in determining how people respond to being stereotyped, participants ranked education and attitude as most influential; they perceived personality as least influential. These findings contribute to the relatively recent body of research investigating the possibility that positive outcomes can result from stereotyping situations.

## Examining Longitudinal Data of Juvenile Delinquents in Rock Hill, South Carolina

*22nd Annual SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2016; TRiO McNair Research Symposium, Columbia, South Carolina, June 2016*

**Student: Jalen Smith, McNair Scholar**

Faculty Mentor: Brad Tripp, Ph.D.

CAS – Department of Sociology and Anthropology

Examining factors that contribute to the initiation, continuation, and desistance of criminal activities is crucial in determining how the criminal justice system can be reformed to decrease recidivism rates and halt the initiation of juveniles into the criminal realm in the first place. This study examines longitudinal data from the daily reports of the Rock Hill Police Department, as organized by the Crime Mapping Division. The study examines juvenile suspects between the ages of 10-17 during 2003-2007. Wave One viewed subjects ages 10-13 in 2003/2004. Wave Two looked at subjects ages 12-14 in 2005/2006, and Wave Three viewed subjects ages 15-17 in 2007/2008. Using the concepts of Criminal Careers and recidivism, the goal was to examine continuation or desistance of criminal behavior over six years. Indicators of race, gender, residence in gang areas, hotspots, and residence in a single dwelling or an apartment were used to predict continued criminal behavior. Most subjects were black or white, with all other races representing less than ten percent of the population. Therefore, only suspects coded as black or white were utilized. The data were examined using Linear Regressions Analysis and Chi Squares tests. The Linear Regressions Analysis found no significant association between offending and race, gender, gang areas, and residence in a single dwelling or apartment for Wave One only, Wave One and Three only, and Wave One and Two only. When examining offending across all three waves, there was a significant association between residents in hotspots and gang areas, as well as race.

## 5 Centers

*Senior Choreography Showcase, Winthrop University, December 2016;  
American College Dance Association Southeast Conference, Tampa, Florida,  
March 2017*

**Students: Sydney Carr, choreographer; Kylie Smith, Anna Bello, Ashley Minton, Hannah Leonard, and Mychaela Smith, dancers**

Faculty Mentor: Meg Schriffen, M.F.A.

CVPA – Department of Theatre and Dance

(DANA 444 – Schriffen)

This piece was crafted from simple beginnings, using short movement phrases that eventually led to the finished product. Each day was spent thinking of interesting pathways and shapes that could be formed, so that the eye always had something to watch. I wanted the viewer to always be interested in what he or she saw. The piece itself doesn't have a specific concept. It more so showcases my style of movement and choreographing.

## Synthesis of Zinc Oxide Nanoparticles using Acetate and Sulfate Salts

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2016*

*Supported by a grant from the Winthrop University Research Council*

**Student: Aaron B. Anderson-Rolfes**

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The synthesis of zinc oxide nanoparticles has applications in multiple areas, ranging from ultraviolet-absorbing skin creams to bacterial remediation. There are many methods to obtain these nanoparticles, and this project investigated variable conditions of aqueous precipitation. The use of water as a solvent is more environmentally benign than current methodology for ZnO nanoparticle synthesis. Products were prepared in a sonication bath and analyzed with X-ray diffraction and particle size analysis. Zinc oxide particles were synthesized using two different zinc salts, zinc acetate and zinc sulfate, along with sodium hydroxide. To prepared zinc solutions (0.01-0.02 M), fixed volumes of sodium hydroxide (0.0500-0.5014 M) were added over 30 minutes of agitation. Relationships between experimental variables and crystal size were examined, where the main variables were differing zinc and sodium hydroxide molarities, synthesis temperature, as well as differences between sonication and stirring. The resulting average particle sizes showed a wide range, with a smallest particle size of 0.60 microns and the largest at 241.3 microns, both obtained with zinc sulfate; acetate samples produced sizes between 5.28 and 172.0 microns. Comparison of the two zinc reagents points to sulfate having the higher capability for smaller particle sizes. The smallest zinc oxide nanoparticles were produced at the high pH of around 12-13.5. Although consistent results were not obtained, two observed trends are that zinc sulfate and high pH produced the smallest particles. These observations are valuable for adding to fundamental knowledge about precipitation from aqueous solution, later leading to reproducible preparations of zinc oxide nanoparticles.

## The Knights Templar: From Poverty to Prosperity

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Josh Knight**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

The purpose of this research is to understand how the Knights Templar, also known as the Poor Fellow Soldiers of Christ, acquired so much wealth. This paper will examine how a small group of men originally tasked with protecting pilgrims headed to the Holy Land would eventually become a huge factor financially in European society. A combination of primary documents and secondary sources will provide information of the leniency offered to the Templar Knights and the economic practices and incomes that allowed the Order to acquire such means. The subject of their fortune was questioned by King Philip IV of France who called for their arrest and the eventual disbandment of the Order. The Templar trials were full of controversy, due to the methods of interrogation used to gain confessions. The Templar Knights have been the subject of movies, books, and many conspiracy theories over the course of history.

## Cell Phone Usage and Perceptions of Relationships

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

**Students: Saige M. Dunlop, Christine Agoris, and Courtney Pearson**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

Over the past couple of decades, cell phone usage has become more prevalent in our society. Our research looked deeper into the motives of cell phone usage and how it affects the perceptions of relationships. We hypothesized that motives for cell phone usage will correlate with the perception of relationships. Within our hypothesis, we thought that negative motives (inclusion, escape, and control) would not correlate with positive perceptions and positive motives (pleasure, affection, and relaxation) would correlate with positive perceptions. Participants consisted of 16 men and 75 women, with a total of 91 participants with ages ranging from 18 to 89. We used the Interpersonal Communication Motives Questionnaire to look at the participants' motives of cell phone usage. We used the McGill Friendship Questionnaire that which examines the satisfaction and positive feeling associated with the participants' relationships. We had the participants take each questionnaire twice, once thinking about the person they text the most frequently and once thinking about the person they text less frequently. We found that pleasure, affection, and relaxation were positively correlated with positive perceptions of someone the participants text most frequently, but escape was negatively correlated. We also found that pleasure had a positive correlation with positive perceptions of someone the participants text less frequently, but escape was negatively correlated. These findings may suggest that there is a correlation between cell phone usage and perceptions of relationships.



## Synthesis of Sphingosine Kinase 1 Inhibitors with Modifications of Zone 2

*68th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Columbia, South Carolina, October 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE)*

**Student: Ansley Nemeth**

Faculty Mentors: Christian Grattan, Ph.D., and Jason Hurlbert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Sphingosine kinase 1 (SK1) is an enzyme known to catalyze the formation of sphingosine-1-phosphate (S1P) in the sphingolipid metabolic pathway. Within the cell, the formation of ceramide from the sphingolipid triggers apoptosis. If apoptosis does not occur, ceramide is catalyzed to form sphingosine. Following this process, SK1 then catalyzes the formation of S1P, which at high concentrations initiates cell proliferation in cancerous systems. Novel inhibitors for SK1 are needed to stop S1P from being produced. We have designed four new inhibitors based upon a known sphingosine kinase inhibitor (SKI) and evaluated the binding affinity of the enzyme for them in silico using the x-ray crystallographic structure of human SK1 with Autodock Vina. These new inhibitors were created with chemical modifications intended to improve the oral bioavailability, while improving or maintaining interactions with SK1. Modifications were made to the central pyrazole ring of the lead compound. The modifications included the substitution for a 5-naphthylisoxazole ring (2A), a 3-naphthylisoxazole ring (2B), a thiophene ring (2D), and a furan ring (2G). Through multiple syntheses, the final products of 2A, 2B, and 2G were successfully created after purification and analysis by <sup>1</sup>H-NMR. The new inhibitors are currently being evaluated via enzyme activity assays to determine how these modifications impact SKI relative to our lead molecule.

## Paul Gauguin and the Cannibalization of Tahitian Culture

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Maria K. Braswell**

Faculty Mentor: Laura Dufresne, Ph.D.

CVPA – Department of Fine Arts

(FREN 360 – Igou)

Primitivism is a word used in the art world to define work influenced by the simplicity of color and form found in the work of non-western people. Artists in the 20<sup>th</sup> century such as Paul Gauguin were often fascinated by this style and would use it in their own work, but at the expense of the people from whom it came. In her book entitled *Consuming the Caribbean*, Mimi Sheller discusses this fascination with the “Other.” In this study of the interaction between the colonizer and the colonized, European interaction with non-western cultures is both a literal consumption of their goods and a visual consumption of their culture. The result is the idea that cultural appropriation is, in itself, a form of cannibalism. The goal of this paper is to illustrate the cannibalization of one culture by another through the analysis of Gauguin’s work during his time in Tahiti.

## Oil and Water: An Investigative Look into the Dakota Access Pipeline

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Ryan Brooks**

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

This investigative reporting project examines the history of the Dakota Access Pipeline’s approval by the United States Army Corps of Engineers and the subsequent protests and controversy that took place after its approval in Cannon Ball, North Dakota at the Standing Rock reservation. The Dakota Access Pipeline is a 1,172-mile pipeline running through Cannon Ball, North Dakota, and crosses land that the Standing Rock Sioux Tribe holds sacred and the Missouri River, which is the source of drinking water for thousands of people. The methods used to examine the timeline of the story include the examination of public documents obtained through document searches and Freedom of Information Act requests, alongside in-depth interviews with an expert in environmental politics and protestors from the Oceti Sakowin protestor camp at the site of the pipeline’s construction. The goal is to understand the key issues and circumstances that led to the approval of the Dakota Access Pipeline’s construction.

## The Role of Exercise in the Health of Children

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Cameron Grant**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

This study will let us know what role moderate exercise plays in the daily lives of young children. Many scientists have been looking into this specific topic for years, and have found some pretty concrete evidence on the effects exercise has on young children. Today, exercise amongst young children is becoming less and less common, leading to many health issues early in life. It has been proven that, when a child begins to exercise at a early age, he or she is more likely to continue being active throughout life. Also, children who become active early on tend to be less likely to suffer from health problems as they age. On the other hand, children who are not active seem less likely to want to exercise when they get older, and some are even too embarrassed to work out or do any sort of physical activity in front of others. Lastly, children who are not active are at greater risk for health issues, including problems such as diabetes, high blood pressure, and heart disease. For years, scientists have been trying to get school systems to understand the importance of implementing physical activity in some part of the school day. The American Heart Association recommends that every individual have some type of aerobic exercise for at least 30-60 minutes a day, three to four times per week, to promote cardiovascular fitness. Once children begin to exercise regularly, we will see a major difference in how children develop and how it benefits their livelihood overall.



## Sports Engagement in Childhood and Adolescence Promotes Resilience in Emerging Adults

*Southeastern Psychological Association (SEPA) Annual Meeting, Atlanta, Georgia, March 2017*

*Winner, CEPO Undergraduate Research Award, 3rd Place Overall, SEPA Annual Meeting, March 2017*

**Students: Anne Marie Maghakian and Alyssa M. Nelson**

Faculty Mentor: Donna Nelson, Ph.D.

CAS – Department of Psychology

Research exploring the benefits of sports participation has revealed that deep engagement in a sport, characterized by dedication, vigor, and enthusiasm, is linked to favorable outcomes including effective self-regulation of behavior and positive emotional experiences. Our purpose was to explore the effects of positive engagement in youth sports on effort expenditure in emerging adults who encounter a challenging situation. To test this, we randomly assigned male and female undergraduate students, with ages ranging between 18-24, to either complete a mental fatigue challenge or a non-fatiguing control task. We then assessed effort expenditure on an anagram problem solving task, defined as number of correct responses. Participants responded to items from the Sport Engagement Scale to assess depth of youth sports investment and were categorized as high or low in prior sports engagement. Analyses revealed that in the low fatigue condition, no differences emerged in effort expenditure as a function of sports engagement. However, in the high fatigue condition, effort was greater for those with high ( $M = 3.14$ ,  $SD = 1.74$ ,  $n = 14$ ), compared to low levels of prior sports engagement ( $M = 1.5$ ,  $SD = 0.76$ ,  $n = 14$ ). These results indicate that when faced with adverse circumstances, persons with a history of deep immersion in sports expended relatively high levels of effort, despite barriers. It seems that passionate investment in sports early in life fosters lasting resilience that enables emerging adults to persist in pursuing goals despite hardships.

## Trade in Medieval Europe

*Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2017*

**Student: Shabreccia Jones**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

Trade in Medieval Europe was a very important aspect to the development of economic life during the period. Trading is an exchange of property, usually without the use of money. Groups that were involved in trading were not likely to trade products that could be easily made by the groups they traded with. They would use their most unique raw materials to create things that were foreign in the eyes of those they traded with, so those products would be more attractive to them. These traders also used the theory of opportunity costs, which is a commonly understood theory in economics. Opportunity costs is evaluating if you are able to make a product more efficiently than another group. If you are able to produce it more efficiently, then you produce that item and trade it with others. However, if you cannot produce it more efficiently, then you would purchase that product from another group prompting you to use your resources on things that you can make more efficiently. There were several major groups that had multiple processes for trading with others based on the organization of their government, economies, and social order. Throughout the process of trade during the medieval period, there were many circumstances that impacted the revenues received by these groups. It is easy to establish some things that may impact the amount of money you can make for trade, such as weather, amount of raw materials available, location, and ability to take things to be traded to name a few. However, there are many other underlying causes of increasing and decreasing revenues based on trade during the medieval period that I will detail throughout this essay.

# 29TH ANNUAL UNDERGRADUATE JURIED EXHIBITION

Each spring, current Winthrop University students are eligible to submit their recent work to the Undergraduate Juried Exhibition. It as an opportunity to have their work chosen by a prominent regional juror to exhibit in a professional gallery setting. Open to students in the Department of Fine Arts and the Department of Design, this annual exhibition showcases Winthrop's brightest talent in areas such as painting, sculpture, jewelry/metals, printmaking, interior design, illustration, and photography. The following list is the selection of artwork in the 29th Annual Undergraduate Juried Exhibition, made by juror Jennifer Sudul Edwards, curator at the Bechtler Museum of Modern Art in Charlotte, North Carolina. The exhibition will be on display April 7 – June 30, 2017 (reopening August 14 – September 1, 2017) in the Rutledge Gallery.

**Karen Derksen, M.A.**  
Director, Winthrop University Galleries

Artist	Title
Charles Waddell	<i>Coming Together</i>
Christopher Brown	<i>Plate #1</i>
Christopher Brown	<i>Tea Bowl #7</i>
Tessa Benoit	<i>EM</i>
Craig Stewart	<i>Untitled</i>
Elizabeth Johnson	<i>Untitled</i>
Olivia Adams	<i>If Anxiety Were a Physical Place</i>
Olivia Adams	<i>Beneath</i>
Annie Doar	<i>Lavender Vase</i>
Cody Cannon	<i>Untitled</i>
Chandlee Freudenberger	<i>Steel Landscape</i>
Jason Sandy	<i>Untitled 2</i>
Jason Sandy	<i>Untitled</i>
Kasey Sears	<i>Bandsaw Box with Bird earrings</i>
Kasey Sears	<i>Life.Death.Life</i>
Erin Powell	<i>Cardboard Series #1</i>
Carsyn Osiecki	<i>Vase</i>
Carsyn Osiecki	<i>Wonky Teapot</i>

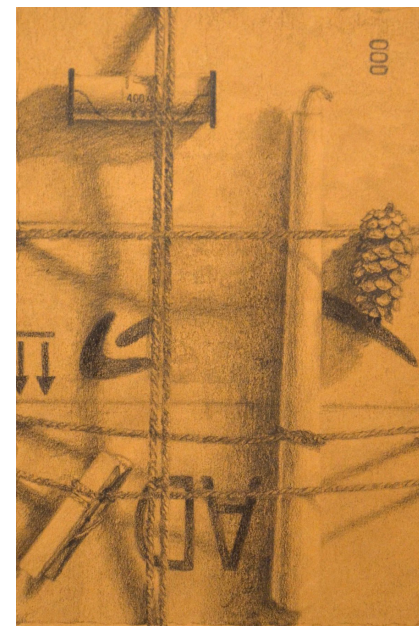
Artist	Title
Carsyn Osiecki	<i>Emergence</i>
Sara Donnelly	<i>Tonka</i>
Madison Burger	<i>Yes it's about sex</i>
Vicki Branagan	<i>Scoop and Pour</i>
Maleah Railey	<i>Medallions</i>
Kristen Rowell	<i>Keep Going</i>
Robert Simoneau	<i>Visiting</i>
Chandlee Freudenberger	<i>Rainbow Skulls</i>
Robert Simoneau	<i>Cradle</i>
Robert Simoneau	<i>Untitled</i>
Laura Knies	<i>Spin Me!</i>
Craig Stewart	<i>Self-Portrait</i>
Craig Stewart	<i>Delirium</i>
Craig Stewart	<i>Look, Mom - no cavities!</i>
Grace Windey	<i>Self Restraint:Voice:Object/Suspended Thoughts</i>
Grace Windey	<i>Swim Sink Succumb</i>
Drew Edwards	<i>Divine Conduct: The Diagonals</i>
Drew Edwards	<i>Hold on Sister</i>
Renee Holliday	<i>HuckLace</i>
Amari Brazel	<i>Grandmother's Sewing Room</i>
Dominique Gadsden	<i>Wood You Take My Hand</i>
Dominique Gadsden	<i>Tooth Decay</i>
Meagan Beauvais	<i>Ring box</i>
Eva Gordon	<i>Tea Bowl Set</i>
Danny Byron	<i>Amygdala III</i>
Danny Byron	<i>Computorp II</i>
Will Lattman	<i>Candy Man</i>
Edie Estes	<i>Annual Awakening</i>
Ariana Williams	<i>Teeny Tiny &amp; Itsy Bitsy</i>
Ariana Williams	<i>Rupture Me This</i>
Ariana Williams	<i>I'm Pretty Too</i>
Ariana Williams	<i>Schluuurp</i>
Ann McClean	<i>Do not make a face</i>
Alyssa Schuster	<i>Sea dragon</i>
Alyssa Schuster	<i>Corrode</i>
Kitty Nix	<i>Open is a Synonym for Vulnerable</i>
Kitty Nix	<i>Sea Urchin Pincushion</i>
Kitty Nix	<i>Octopus Toy Necklace</i>
Kitty Nix	<i>Tropical Brooches</i>
Kelly Williams	<i>Patiently Waiting</i>
Charlie Hickey	<i>Holy Ship Fatman</i>
Charlie Hickey	<i>Circuit Minor</i>
Meaghan Westfall	<i>Procession of Formality</i>
Samuel Carter	<i>BATTLESHIP: We're all animals</i>
Kristen Rowell and Sarah Kear	<i>A Safe Place</i>



*Spin Me!*  
**Laura Knies**  
 2nd Place



*Corrode*  
**Alyssa Schuster**  
 Best in Show



*Cardboard Series #1*  
**Erin Powell**  
 Juror's Honorable Mention



*Untitled*  
**Craig Stewart**  
 3rd Place

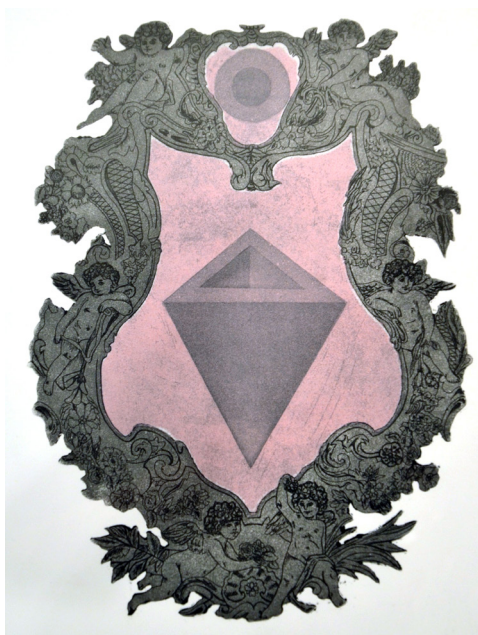


*Medallions*  
**Maleah Railey**  
 1st Place





*Visiting*  
**Robert Simoneau**  
 Juror's Honorable Mention



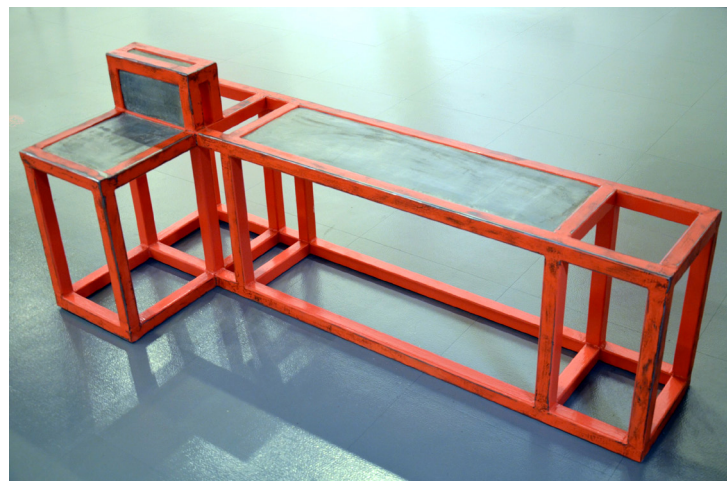
*Procession of Formality*  
**Meaghan Westfall**  
 Juror's Honorable Mention



*Untitled*  
**Jason Sandy**  
 Lewandowski Merit



*Sea dragon*  
**Alyssa Schuster**  
 Juror's Honorable Mention



*Untitled*  
**Cody Cannon**  
 Lewandowski Merit

# DEPARTMENT OF FINE ARTS

## SENIOR EXHIBITION

The 2017 Senior Exhibition of the Department of Fine Arts is an important component of the crucial courses ARTS 500, Senior Studio Seminar for B.F.A in art candidates, and ARTS 501, Senior Project Seminar for B.A. in art candidates. Students develop personal professional websites, while also preparing a group exhibition that highlights their artistic and conceptual growth. The exhibition will be on display April 4 – 17, 2017. The work can be viewed online at [www.winthropseniorexhibition.com](http://www.winthropseniorexhibition.com).

### Faculty and Administration

Mark Hamilton, Professor, Photography

Dallas Austin, Adjunct Professor of Fine Arts

Carolyn Sumner, Assistant to the Chair

Dylan Bannister, Adjunct Professor of Fine Arts

### Artist Statements

#### Garrett Bowman, B.F.A. in Art

I create drawings and photographs inspired by my experiences in faith and the message of the gospel. To construct the drawings, I use charcoal, graphite, and other mediums. The photographs are created using pre-digital film processes that are then printed through traditional darkroom printing techniques. The intention of this work is for viewers to ask questions about their internal opinions and outwardly expressed viewpoints. My hope is that my work will provide a catalyst for conversation about the hope and grace that can be found in the gospel.

#### Shelby Furr, B.F.A. in Art

In my latest work, I have been exploring the nude figure. There is something jarring yet intimate about a naked body that I attempt to capture in my photographs. This image is from a series of photographs exploring flowers alongside the figure, juxtaposed with text. I began to explore text in my images after studying a painting by Jenny Saville of a nude figure with text on the body. The inclusion of flowers was inspired by a book by photographer Walter Hubert, *Naked: Flowers Exposed*.

#### Morgan Willis, B.F.A. in Art

*Wall Pockets* is the start of a series of ceramic vessels that live on the wall. Each wall pocket is filled with a material that I have either already used or a material that I am considering in another ongoing series. I see wall pockets as a log of ideas. I make ceramic sculptures that are process-based with organic qualities. My current process starts with draping slabs over both flat and irregular surfaces. After I build up tiny vessels using coils and pinch pots, I alter this form by making impressions with my fingers and pushing out some sections from the inside. I finish the sculptures by filling the vessels.

#### Khayla Chapman, B.F.A. in Art

My work is celebratory of personal experiences, black culture, social identity, and the 1990s. Using various media, I create paintings and drawings that are bold, colorful, detailed, and, to some, nostalgic, which creates dialogue and starts many conversations. I view my own work as southern anecdotes, works that are understood naturally by people like me and inspire inquiry from others. As a native of Charleston, South Carolina, I do not wish to fall into the category of another artist that caters to tourists. To me, the portrayal of southern black people, working in fields or on boats as the oppressed, is exhausting. Instead, I take a more contemporary approach in representing the lifestyle of melanated figures like me.

#### DeVon Ford, B.A. in Art

My work is two-dimensional and revolves around black culture, pop culture, and universal themes, such as love and unity. I use a variety of mediums to bring my ideas to fruition, such as charcoal, acrylics, colored pencil, and graphite. I take references from pop culture and put my own unique spin on them to give the image its own unique quality. Inspiration to make art comes from things that I observe in the world around me every day: music, television, politics, friends, culture, etc. Creating art brings me a sense of tranquility and expression. It is my hope that, while I create art based off my personal interests and feelings, the viewer will arrive at similar feelings.

#### Kitty Nix, B.F.A. in Art

My work explores relationships within form and texture, and the various ways of shaping and forming material. In metal, I've explored chasing and repousse, forming techniques, and integrating alternative materials. Often, pieces consist of marriages between metal and fabric, with a combination of sewing and metalsmithing techniques. As a sculptor, I use fabric and blacksmithing techniques to explore form on a larger scale. Most recently I have explored relations to the body and natural organic forms. Aquatic and plant life inspire me, due to the vast range of unique forms and movement. It is at the intersection between formality and materiality where my work emerges. My recent metalwork has an increased emphasis on figurative elements and interaction with the body. Parts of the human body are misplaced, distorted, or put into an uncanny context, narrowly avoiding the grotesque. The recontextualization of the figure is a direct confrontation of identity, and questions the significance of the corporeal aspect of living. My recent sculptures explore texture and form, taking inspiration from aquatic flora and fauna.



### **Chandlee Freudenberger, B.F.A. in Art**

I deal mostly with steel in my sculptural work. I became enamored with the material over time, while working in the foundry at Winthrop and still enjoy making work with steel very much. I enjoy creating many types of objects, from wearables to entirely decorative objects. Steel can be molded into many different and interesting forms, and that is why I find it enjoyable to work with. The goal of my work is to make steel feel like a material that is formed or grown naturally, rather than one made in a factory. I try to create a sense of growth through the layering of welds on top of welds, and by selectively rusting and melting out areas of the forms. I also spend time allowing the rust to spread naturally, and layer synthetic cotton mixed with wood glue and steel dust to create even more growth. I believe that the poetic nature of my sculpture comes from the use of synthetic materials to create a “living” object.

### **Becky Fuller, B.F.A. in Art**

I use photography as a means of story preservation: photographs have a unique way of capturing a moment, an emotion, and a person. My goal is to use my camera as a means to get to a world of new relationships and new stories. My choice of subject comes from a deep place of personal interest, people. We are all uniquely woven with experiences, personalities, thoughts, and features. I am curious as to what lies behind each person’s eyes and what experiences have touched them. My photography captures a moment in time and preserves the memory. My style is bright and natural, vibrant with color. I want my photographs to be airy and timeless, regardless of whether they were taken in studio or with natural light.

### **Charlie Hickey, B.F.A. in Art**

*Violet Are Violent:* This work addresses the level of hyper-masculinity and violence to which biologically male children are exposed and its influence on their self-identity and social views. The toys, keepsakes, and letters in the drawers are all items that I played with or collected during childhood. The arrangement of these items is reminiscent of the compositions/displays I made out of important objects on my dresser top as a child. The composition on the actual dresser top is a gathering of items representing what I perceived in my youth to be masculine. The gun above the dresser top is an M14 rifle that was the military standard in several conflicts and remains a common gun in many video games today. The placement of the gun makes it the most influential and prominent object in the work, which serves to emphasize its purpose as a representation of the violence throughout all the displays. The arrangement as a whole is both a hierarchy and a timeline, showcasing transitioning interests through boyhood, as well as an underlying perpetuation of violence common in American male identity.

### **Alyvia Dyches, B.F.A. in Art**

In my photographs, I utilize traditional film processes, both 35mm and large format film, in addition to digital photography techniques. Within my subject matter, I delve into themes of dream interpretation, the subconscious, and ideas from psychology. I make images that transcend reality. Recently, I have started photographing weddings and events, in order to broaden my subject matter and to gain those business skills.

### **Reannah Rowland, B.F.A. in Art**

My current body of work has been focused on replicating parts of the human body in various materials and placing them in an unfamiliar and somewhat uncanny context. These ideas came to fruition through the exploration of casting, creating molds, and arranging the casts in such a way that might elicit a reaction from an audience.

### **Jordan Sommer, B.F.A. in Art**

This particular body of work is derived from a recent installation of more than 300 wooden stars suspended inside a blanket fort. Each star was spray-painted for the installation. After realizing that the stars produced an interesting stencil effect, I made a series of drawings utilizing the same process.

### **Meaghan Westfall, B.F.A. in Art**

My work is a balance between ideality and actuality. I have a habit of developing ideas of how an intangible emotion or feeling can best be portrayed. My past work revolved solely around the emotions of others. I attempted to find ways of healing the viewer or making some sort of positive emotional impact through light and material, something that makes you question the positivity of colors and materials. However, recently I have begun to use forms of concrete to represent time and memories, while using colored light to create an environment that allows others to step into parts of my own emotions. I associate things that are intangible with tangibility. I create spaces that make my headspace visible to others, giving them the freedom to feel certain emotions relating to the colors and objects within my installations and two-dimensional work.

### **Danny Byron, B.F.A. in Art**

This work is based around intuitive compositions and structures, to show destruction through surreal bodily form. Although these images come from an intuitive place of creation, I wish to convey a collapse through the way these images interact with each other and the viewer – both a personal collapse, and global, societal collapse.

### **Grace Windey, B.F.A. in Art**

My current work focuses on the impact of personal experience on the creative practice. Through reflection over my time as an undergraduate, I’ve decided to revisit incomplete ideas and renovate my practices simultaneously. My work has centered on trauma for a long time and produced a body of work that is resilient and provocative. Moving forward, my goal is acceptance, not only of my practices but also of myself. I have always believed in persistent questioning. It is a staple in my art making. That intense introspection has been a challenge and often an obstacle to my art. I was ashamed of my fluidity and boldness. I was self-conscious about my multidisciplinary approach. I see now that making is in itself a question. It doesn’t have one answer. I want my answer to be genuine. This current body of work seeks to scrutinize old works and bring them into a clearer scope. I am turning trauma into training and practice into preparation.



**Becky Fuller**



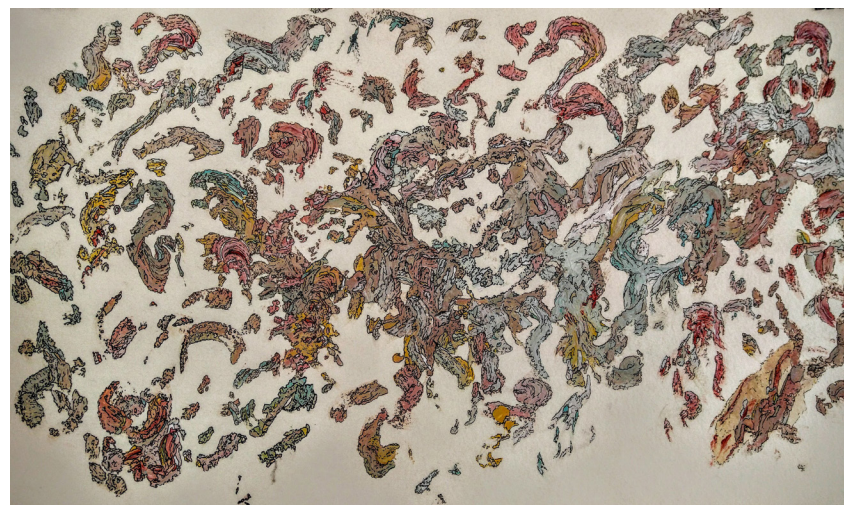
**Meaghan Westfall**



**DeVon Ford**



**Alyvia Dyches**

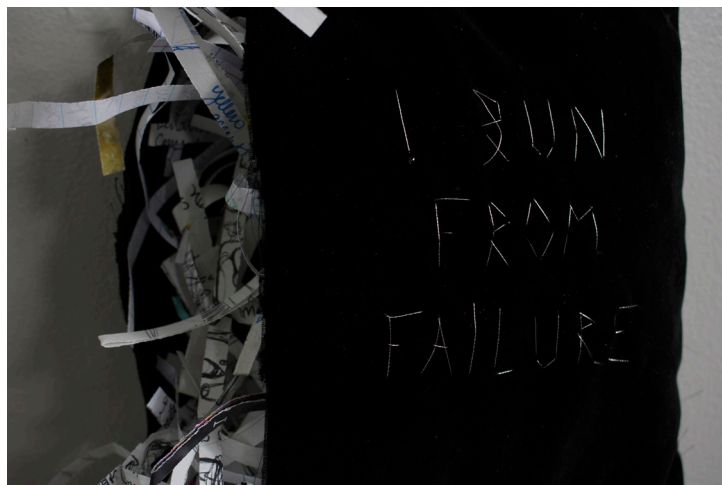


**Danny Byron**





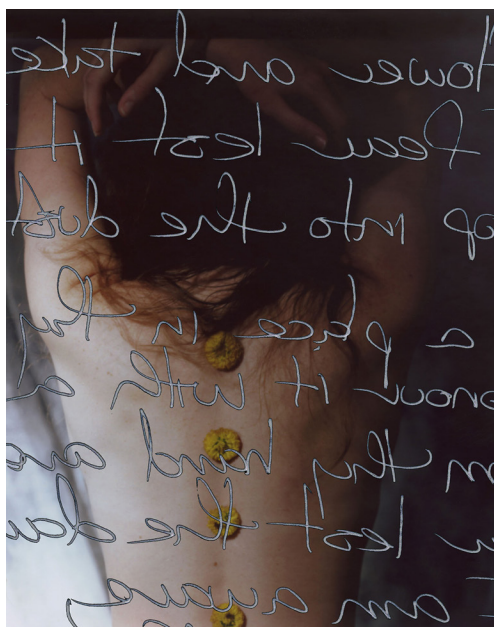
**Chandlee Freudenberger**



**Grace Windey**



**Khayla Chapman**



**Shelby Furr**



**Jordan Sommer**

# DEPARTMENT OF DESIGN

## SENIOR EXHIBITIONS

### Visual Communication Design Senior Portfolio Show

Karis Burgin  
Anthony Dean  
Anna Gervais  
Joshua Hollis  
Renee Kimbrell  
Paige Mitchum  
Eric Morrison  
Dylan Nichols  
Ryan O'Shields  
Tzu-chien Yen

### Interior Design Senior Portfolio Show

Courtney Clift  
Hillary Corteville  
Callan Gaines Carpenter  
Steven Hawes  
Sally Huffman  
Courtney Johnson  
Christina Rawls  
Julia Turner





Courtney Clift



Courtney Johnson



Sally Huffman



Christina Rawls



Julia Turner



Hillary Corteville



Callan Gaines Carpenter



# DEPARTMENT OF MUSIC

## UNDERGRADUATE RECITALS

### Student Recitalists

**Emmalee Wood**, mezzo-soprano

B.M.E., Choral

Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Alexis Croy**, soprano

B.M., Performance

Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Molly Andorfer**, mezzo-soprano

B.M.E., Choral

Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Shelby Lindler**, violin

B.M.E., Instrumental

Faculty Mentor: Kari Giles, M.M.

**Ryan Hobbs**, trombone

B.M.E., Performance certificate

Faculty Mentor: Martin Hughes, D.M.A.

**Tyler Roth**, clarinet

B.M.E., Instrumental

Faculty Mentor: Deborah Loomer, D.M.A.

**Naiesha Wise**, cello

B.M.E., Instrumental

Faculty Mentor: Elizabeth Burns, M.M.

**Riley Pagett**, euphonium

B.M.E., Instrumental

Faculty Mentor: Douglas Black Jr., D.M.A.

**Lori Lynne Hurst**, flute and piccolo

B.M.E., Instrumental

Faculty Mentor: Jill O'Neill, M.M.

**Marion Middleton**, clarinet

B.M.E., Instrumental

Faculty Mentor: Deborah Loomer, D.M.A.

**Chrisa Murray**, trumpet

B.M.E., Instrumental

Faculty Mentor: Richard Harris, M.M.

**Anthony Russo**, trumpet

B.M.E., Instrumental

Faculty Mentor: Richard Harris, M.M.

**Nicole Rose Ernst**, soprano

B.M.E., Choral

Faculty Mentor: Kristen Wunderlich, D.M.A.

**Brady Hartness**, composition

B.M., Composition

Faculty Mentor: Ron Parks, Ph.D.

**Hannah Jessup**, soprano

B.M., Performance

Faculty Mentor: Kristen Wunderlich, D.M.A.

**Ellis Hendrix**, guitar

B.M., Performance

Faculty Mentor: Lewis H. Dickert, Ph.D.

**Ashley Reynolds**, soprano

B.M., Performance

Faculty Mentor: W. Todd Geer, M.M.

**Jonathan Chavis**, composition

B.M., Composition

Faculty Mentor: Ron Parks, Ph.D.

**Joseph Booth**, saxophone

B.M., Performance

Faculty Mentor: Tracy Patterson, D.M.A.

**Noah Bruening**, saxophone

B.M.E., Performance certificate

Faculty Mentor: Tracy Patterson, D.M.A.

### Piano accompaniment provided by:

Jennifer Austin

Lannia Broñola-Dickert

Mary Ann Helton

Amy Morris

Kathryn Owens

# DEPARTMENT OF THEATRE AND DANCE FESTIVALS AND SHOWCASES

## Fall One-Act Festival, November 2016

Lively, entertaining, and eclectic collections of one-act plays directed by advanced theatre students

Faculty Coordinator, Sarah Provencal

*Only 13* by Tom Quinn, directed by student **Dylan Carpenter**

*The Most Massive Woman Wins* by Madeleine George, directed by student **Phylisha Mace**

*The Gift* by Kendall Marlowe, directed by student **Sydney Taie**

*Clara* by Arthur Miller, directed by student **Maggie Shaw**

*Waiting for My Cyber Boy* by Tim Mogford, directed by student **Kareem Wilson**

*Neither Here Noir There* by Bambi Everson, directed by student **Elon Caulder**

*One Tit, A Dyke, and Gin!* by Pennell Somsen, directed by student **Rachel King**

## Spring One-Act Festival, April 2017

Lively, entertaining, and eclectic collections of one-act plays directed by advanced theatre students

Faculty Coordinator, Sarah Provencal

*Check, Please* by Jonathan Rand, directed by student **Jamie Shinn**

*Trip's Cinch* by Phyllis Nagy, directed by student **Elon Caulder**

*The Actor's Nightmare* by Christopher Durang, directed by student **William Keen**

*Poof!* by Lynn Nottage, directed by student **Brianna Young**

*Uncovered* by Greg Urbaitis, directed by student **Titus Quinn**

*I Dream Before I Take the Stand* by Arlene Hutton, directed by student **Shayna Wickens**

*This Side of Heaven* by Don Zolidis, directed by student **Cameron Drayton**

## Senior Choreography Showcase, December 2016

This showcase of modern dance works features the choreographic talents of senior dance majors.

Faculty Director, Kelly Ozust

*Surrender to Feel Again*, choreographed by **Natalie Bradley**

*5 Centers*, choreographed by **Sydney Carr**

This dance was selected for performance in the informal concert at the American College Dance Association Conference.

*Darken Route*, choreographed by **Kennedy Crosby**

*Deception*, choreographed by **Christopher Davis II**

*One Raindrop Raises the Sea*, choreographed by **Jennifer Kight**

*Keep Going*, choreographed by **Shelby Lewis**

*None of Us Are Free Until All of Us Are Free*, choreographed by **Megan Long**

*Push*, choreographed by **Jessica McFarland**

*23 Pairs*, choreographed by **Jordan Mickle**

*To Be Misunderstood*, choreographed by **Ashley Minton**

*Journeys Beyond*, choreographed by **Iris Myers**

*Synthesis*, choreographed by **Hannah Potter**

*of infinite form*, choreographed by **Billy Thompson**

*They Ran Out of Wall*, choreographed by **Carly Thompson**

*We've Had Enough*, choreographed by **Carmen Trull**

*Void*, choreographed by **La'Raine Turlington**

This dance was selected for performance in the adjudicated formal concert at the American College Dance Association Conference.

## Junior Choreography Showcase, April 2017

Modern dance works choreographed by advanced dance majors.

Faculty Director, Emily Morgan

*Where we Stand*, choreographed by **Christopher Davis II**

*Connect, Disconnect*, choreographed by **Mikaela Laxton**

*Belief to Desire*, choreographed by **Jordan Mickle**

*For the Moment*, choreographed by **Morgan Nawrath**

*One Step Behind*, choreographed by **Hannah Price**

*Mind over Matter*, choreographed by **Jade Salazar**

*acetylcholine*, choreographed by **Carley Tomlinson**

*Option #2*, choreographed by **Katie-Laken Weeks**

# Works Performed at SOURCE 2017

The following theatre and dance pieces will be performed at the Third Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE) at Winthrop University, April 2017.

## connect, disconnect

**Student choreographer: Mikaela Laxton**

Performers: Katelyn Arledge, Erika McLendon, Carly Thompson, Rachel Trotter, Becca Jackson (Understudy)

This piece explores the ideas of how our memories affect the way we view our lives. Throughout the process I have been using the ideas of how one person’s memories can change the way we view our past, present, and future. I also explored the idea of how most of our memories we are not aware of.

## For the Moment

**Student choreographer: Morgan Nawrath**

Performers: Anna-Grace McLaughlin, Kylie Smith, Brooke Tindal, Rachel Trotter

This piece is about time and how time is continually passing. The dancers themselves represent time. Time is continually passing, but sometimes we feel as if it is moving slower or faster than it really is.

## Red by John Logan

**Student Director: Garrett Whiffen**

Rothko: William Keen  
Ken: Chris Chewning

Stage Manager: Sydney Taie  
Assistant Stage Manager: Caitlin Byrne  
Set: Ashley Jensen  
Props: Jobina Cummings  
Sound: Mariah Barrie  
Lights: Dylan Carpenter

Synopsis: “What do you see?” Famed abstract expressionist painter Mark Rothko asks his young assistant, Ken, the loaded question: What’s art? And who gets to decide, anyway? It’s 1958, and Rothko has just been offered the biggest commission in the history of modern art. He and Ken work feverishly in his New York studio – until Ken begins to realize his answers to those fundamental questions about art are very different than his mentor’s.

## acetylcholine

**Student choreographer: Carley Tomlinson**

Performers: Megan Long, Erika McLendon, Lexy Sharpe, and Merideth Smith

This piece was intended to be an exploration through movement of portraying the degeneration of chemicals in the brain during Alzheimer’s disease and dementia. It stemmed from watching those who suffer from this disease, as well as caring for and watching others who care for those with these diseases.

## Option #2

**Student choreographer: Katie-Laken Weeks in collaboration with dancers**

Performers: Amber Jones, Jennifer Kight, Erika McLendon

They gave her two options: one was to let it be, and the second was to fight it. She chose the second option, and said that she was willing to fight, no matter what it took. Not only does the second option apply to her current battle, but also the ones that continue to reoccur and challenge her each day. Her brain may be confused and fatigued, and her legs may not know what to do and give out, but she does know that she wants to live. She has always chosen to not give up, and that shows who she is as a person; that she is strong, motivated and empowered.

Having my dancers represent a disease is not the easiest task for me to ask of them; therefore, I researched each disease and used the information I found to help my dancers connect with their roles more efficiently. The three things that I researched were: what happens to the brain (specifically the left hemisphere) during a stroke; the effects of a left-hemispheric stroke and process of physical therapy for someone who is recovering from a left-hemispheric stroke; and the side-effects of undergoing radiation and chemotherapy treatments for liver cancer. Finding terminology that I could decipher to inform my dancers helped tremendously, and allows them to portray each disease appropriately.

## One Step Behind

**Student choreographer: Hannah Price**

Performers: Mason Tomberlin, Lexy Sharpe, Kennedy Crosby, Anna Grace McLaughlin, Brooke Tindal

This is the first time I have choreographed a full piece, so it was a very new experience for me. I wanted this to be something relatable to everyone, so the concept of this piece is about reaching for something. I believe people are always striving for the next thing in their lives, whether it be big or small. I tried to explore that idea in various ways throughout the piece.

# ADDITIONAL PROJECTS

## Energy Conservation in Winthrop Residence Halls

**Student: Anna Guild**

Faculty Mentor: Christopher Johnson, B.F.A., M.Arch.

CAS – Department of Interdisciplinary Studies

This research aims to investigate university residence halls' energy consumption at Winthrop University and the subsequent impact education will have on that energy consumption. Specifically, this research will determine if an education and feedback program would have a significant effect on residence hall energy consumption, compared to a hall that did not receive any form of education. Analysis will compare energy data collected from nine residence halls before and after the energy conservation program is complete. This analysis will determine if energy conservation education resulted in a positive influence on resident behaviors and energy consumption habits. These findings will then suggest the types of education and feedback that may be key components of sustainable energy consumption.

## The Effects of Tommy John Surgery on High-Level Baseball Players

**Student: Jake Sullivan**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance  
(PESH 381 – Schary)

Ulnar collateral ligament reconstruction, or Tommy John surgery, is becoming more and more common in the game of baseball today. The motion for throwing a baseball is not natural and puts a lot of stress on the UCL. Every time players throw a baseball, they are creating micro-tears in their UCLs, and it is just a matter of time before their ligaments tear, resulting in the need for surgical repair. There have been many studies done on the return to play after the reconstruction, and the surgery has been proven to be more successful than unsuccessful. The technique and rehabilitation for the surgery have been under discussion for a while, as there are certain procedures and techniques that doctors take that can have different outcomes on the recovery process. Although the surgery has reported high success rates, there are still athletes who have reported complications and have seen a decrease in their ability to compete at the same level. The decrease in throwing velocity is something that can end a player's career, and when players undergo Tommy John surgery, they are putting themselves at risk for decreased performance. This study aims to find the benefits and disadvantages of receiving the surgery, and to investigate whether there is a certain technique that results in higher success rates.

## Hypocrisy and Inconsistency in Sodomitical Trials

**Student: Erik Martin**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

In the late 13<sup>th</sup> and early 14<sup>th</sup> centuries, records of trials against sodomizers began to be published. In this time period, sodomy was described as homosexuality or bestiality. The punishments varied from whipping to burning to hanging. Since the 13<sup>th</sup> century, lesbianism has been grouped in with sodomy and from then on, it also carried a similar punishment. Also, lesbianism was rarely prosecuted because few laws were recorded regarding lesbian activity specifically. This paper will explore some of the earliest European records of sodomy, from the 1100's to the 1500's. The author believes that this paper will uncover hypocrisy in the old Church. John/ Eleanor Rykener claimed that priests paid the most money for homosexual acts. People in positions of power were more harshly prosecuted. Arnold of Vernouille was a high priest in France when he was accused of sodomy in 1323. He was chained up and fed only bread and water for the rest of his life. The judge reportedly only cared about the fact that he was a clergy member and he sinned. In 1424, an Italian cook was hanged for his homosexual relationship. The cook had a relatively short-term struggle. The priest, however, had to live day after day with guilt and despair. This paper will describe the ways that homosexuals were killed and how the punishments were inconsistent.

## Synthesis, Characterization, and Antimicrobial Activity of Trifluoromethyl-1*H*-pyrazoles

**Student: Jeremy Tuck**

Faculty Mentor: Christian Grattan, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552 – Hanna)

Antimicrobial resistance is a growing, complex problem, and the diminishing effectiveness of many important drugs necessitates the discovery of new antimicrobial compounds. Pyrazoles are one class of compound exhibiting significant antimicrobial activity, and may be integral in mitigating the risk of treatment-failure associated with antimicrobial resistance. In the present study, several aryl and trifluoromethyl-1*H*-pyrazoles were synthesized from the condensation of 1,3-diketones and hydrazine under microwave irradiation. These compounds and their structures were confirmed by <sup>1</sup>H, <sup>13</sup>C, and <sup>19</sup>F NMR, as well as melting-point determination, indicating microwave-assisted synthesis as a viable method in the efficient formation of these aryl- and trifluoromethyl-substituted pyrazoles. The newly synthesized compounds were screened for antimicrobial activity by disk diffusion testing against *Escherichia coli*. All of the aryl- and trifluoromethyl-1*H*-pyrazoles displayed a certain degree of antimicrobial activity against *E. coli*, with a naphthyl- and trifluoromethyl-substituted compound exhibiting the most significant antimicrobial properties.



## Evolution and Biomechanics of the Male Copulatory Organ in Schizorhynchia (Platyhelminthes)

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH-INBRE) and Winthrop University Research Council*

**Student: Brooke Davis**

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology

In the phylum Platyhelminthes there lies a clade called Schizorhynchia that possesses more than 150 different species. Schizorhynchia are predacious hermaphrodites that are known to live between the sand grains at the beach. Their prominent male copulatory organ was used for classifying different species. However, the last review of their organ was based on light microscopy observations only, and recent phylogenetic testing did not support the current classifications. Therefore, our research entailed an extensive study of the male copulatory organ, using the confocal-laser-scanning microscope; this allows us to see the arrangement of nuclea, musculature, and cilia on the organism, most of which are incredibly difficult to distinguish using light microscopy. We studied the male copulatory organ in *Carcharodorhynchus* and compared to *Proschizorhynchus* and *Carolinorhynchus*, both of which are evolutionarily more derived than the *Carcharodorhynchus*. We found that even though *Carcharodorhynchus* is in a more basal position in the Schizorhynchia, it still possesses similar construction in the male copulatory organ, suggesting that the anatomy found in the more derived forms extends to the base of the clade.

## The Impact of the Black Death on European Society

**Student: Carolyn Wilkerson**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

The Black Death that struck Europe between 1346 and 1353 left a lasting impression on everyone that lived through it. It killed roughly 60 percent of Europe's population at the time. My purpose is to look into the plague and discuss how it impacted different groups of people within European society. Some of the groups that I will look into are the peasants, Flagellants, Jews, and Christians. The Black Death also impacted the economy in Europe, especially when it came to the peasant class. I plan to focus on how these groups reacted to the Black Death and how it changed them. Some groups somewhat prospered from the impact of the plague while others were tortured and killed. It impacted everyone that it came across, and it was a shock to them. They did not understand why it was hitting them so hard. For example, the Christians and Flagellants thought that it was God's wrath. The Christians also blamed the Jews for poisoning them. Some of the main primary sources I plan to use are Petrarch and Boccaccio in order to understand the emotions and experiences of those Europeans at the time. The Black Death that occurred in Europe between 1346-1353 had a major impact on the society overall along with the peasants, Flagellants, Jews, and Christians; it changed the social structure and how certain groups saw themselves along with the economy.

## Pompeiiian Garden Paintings

**Student: Margaret L. Claytor**

Faculty Mentor: Kathleen Ann Burke, M.F.A

CVPA – Department of Fine Arts

(ARTH175 – Burke)

The city of Pompeii is a historically new discovery since the eruption of Mt. Vesuvius covered the city in ash in 79 CE. Since Pompeii's excavation in the 18th century, the city has been studied closely to learn about the city's culture. Art and nature were very important aspects in the Pompeiiian lifestyle. By examining photographs taken from inside prominent villas and their description from archeologists, I tried to connect the relationship that art and nature had with one another. I focused on garden wall paintings located in the home gardens of the wealthy Pompeiiian citizens. The theories behind the subject matter varied from wanting to expand the size of the garden into the wall, seeking the essence of paradise, and following the exotic trends of wild animals and goddesses of Rome. Fences, birds, fountains, and green plants were popular subjects of the paintings and each held a specific purpose. I was able to come to the conclusion by the images and theories examined that nature was held at a high standard in art around Pompeii. It was the ideal of paradise and the citizens sought to replicate it in their art to express their ideal beauty.

## Morgause and Guinevere: Nonexistent to Most Important

**Student: Amy L. Asbury**

Faculty Mentor: Jo Koster, Ph.D.

CAS – Department of English

(ENGL 307 – Koster)

An examination of the main female characters in Jane Yolen's modern Arthurian adaptation *Sword of the Rightful King* and a contrast with their counterparts in Thomas Malory's *Morte d'Arthur* demonstrates how much the role of women in the Arthurian tradition has changed and how Arthurian tradition itself is transformed by the culture around it. Morgause is the first examined character. Her role in Malory's work is nearly nonexistent: she is defined by the men in her life. She is only called by her own name twice. In *Sword of the Rightful King*, on the other hand, Morgause is a powerful witch and Queen of Orkney, who intimidates and manipulates men as she desires. She plays a large role due to her own goals rather than her relationships with men. Guinevere is the second examined character. Her role in Malory's work is to push men forward and show readers how good men are at winning battles and saving lives. Her character relies heavily on men. In *Sword of the Rightful King*, Guinevere not only fights her own battles, but she uses men. In the end she is proven to be the rightful ruler of Camelot, rather than Arthur. In Yolen's work these two women are each other's only worthy opponents, whereas in Malory's work neither woman is important enough to merit an opportunity to have opponents. This marked difference between Malory's *Morte* and Yolen's *Sword* reveals the always-changing nature of the Arthurian tradition due to the culture around it.

## The Rise of the Great Leader Saladin

**Student: Larry Wilson**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

Saladin is one of the greatest military and political leader of all times. Saladin was born of Kurdish decent and was the leader of the Islamic people of his time. Saladin reigned during the middle and late 1100s. During his time of dominance, he had many followers that wrote documents considering his abilities as a leader, as well as telling stories that were directly connected and reflected his character. Saladin grew up in a strong military family and received the best training as a young child. The purpose/questions are the following: why is Saladin considered one of the greatest military leaders of all time? How was he able to be such a successful leader and sustain for such a long period? How does Saladin compare to other great leaders of his time? This paper will discuss Saladin's upbringing and how it shaped him into the great leader that he would eventually become; the successes and the failures of his early military expeditions that helped propel him to the position of Sultan; as well as his character and how the treatment of his men made him such as great leader. Finally, I will look at his ability to be a transcending military and political leader. A man of Saladin's stature had many detractors, but was respected by the Medieval leaders of his time. Saladin was a renaissance man in the sense he was able to be a feared military leader, while also being a kindhearted and caring person.

## The Norman Conquest and Its Effects on English Social Classes: How the Norman Outsiders Managed to Dominate the Social Hierarchy and the English Reaction

**Student: Katherine Dunphy**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

The Norman Conquest drastically changed England in numerous ways. The purpose of this paper is to look at one of the most important transformations, the restructuring of English social classes and how both the Normans and English reacted. After the Battle of Hastings in 1066, the Normans, led by William the Conqueror, changed the English social classes by replacing the English elite, introducing the feudal system, and reducing the number of free individuals. As a result of these changes, the English reaction involved resentment of their new rulers for changing their way of life and the cruel actions taken against them during the conquest. They viewed the Normans as outsiders and opposed them, as seen by numerous revolts. The Normans on the other hand believed their conquest was legitimate based on the blessing of Edward the Confessor and the previous Norman influence. They were also well aware of the English's hatred, as seen by their construction of castles and instating new laws for protection. As a result of the changes brought by the conquest, the English had their world overthrown by a minority of outsiders who fundamentally altered their society.

## A Battle across the Mediterranean: A Comparative Study of the Western European Christians and the North African Muslims

**Student: Jordan A. Reilly**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

This paper seeks to analyze the multifaceted relationship between the Muslims of North Africa and the Christians in Spain from 1040-1269 under the Almoravid and Almohad dynasties. United Arab and Berber forces of North Africa extended the power of their empire into Christian lands in Southern Spain starting in 1040. Muslims and Christians interacted little outside of warfare in the early years of the Muslim conquest of Christian lands. A mutual understanding of a beneficial relationship changed the dynamic of the two empires. Trade became an important unifying factor, understanding that it was more successful to work as partners than die as enemies. As all good must come to an end, Muslim-Christian relations changed with the times. Two Berber dynasties came to rule in al-Andalusia and thus with a change in power came yet again a change in the Muslim-Christian dynamic. This paper analyzes the complex relationship between the two powers to understand its effects on the success and failure of both dynasties. While the conquest of Spain proved beneficial for both the Christians in Europe as well as for the Muslims in North Africa, that same conquest proved also detrimental to the survival of the two Berber dynasties of North Africa.

## The Rise of Actively Managed Exchange Traded Funds

**Student: Nicholas A. Cunningham**

Faculty Mentor: Philip Gibson, Ph.D.

CBA – Department of Accounting, Finance, and Economics

(FINC 315 – Gibson)

This research paper seeks to explore the history and evolution of exchange traded funds (ETFs) into actively managed ETFs, as well as discuss the challenges and current research related to actively managed ETFs, limited to the funds sold on exchanges in the United States. ETFs are arguably one of the most impactful investment vehicles created since the derivatives market began in 1973. They provide many benefits that cannot be found in other investment options and have become extremely popular with both institutional and individual investors. Beginning in 2008, the actively managed ETF began in hopes of building on the success of the passively managed ETF. However, with the actively managed ETF came challenges, specifically in the area of its newness and potential tax consequences. Additionally, research has been conducted which has shown the detrimental effects of the full disclosure transparency requirements for actively managed ETFs, the varying results when comparing actively managed ETFs to passively managed ETFs, and the uncertainty behind the future of actively managed ETFs as a whole. As a result, it is clear that more time must pass before a clear conclusion regarding many of the facets of actively managed ETFs will be able to be made with any level of certainty.

## Enhancement and Synthesis of Sphingosine Kinase 1 Inhibitors

**Student: Angel Castro**

Faculty Mentor: Christian Grattan, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Sphingosine Kinase 1 (SK1) is an enzyme that cancer utilizes to cause proliferation in the sphingomyelin pathway and increase the malignancy of cancer. An inhibitor for Sphingosine Kinase 1 has been discovered to halt cell proliferation, but it is not effective because of poor hydrophilicity. The template inhibitor was separated into four zones based on its functional groups, in order to optimize its structure synthetically. The focus of this research was on the naphthaldehyde ring on the inhibitor, which is known as Zone 1, with the goal of decreasing inhibitor hydrophobicity. The derivatives of the Sphingosine Kinase 1 inhibitor that were made contained a benzothiophene ring, benzene ring, and 1,2-dimethoxybenzene in place of the naphthaldehyde ring in Zone 1. These three derivatives all had the intended effect of lowering the hydrophobicity of the SK1 inhibitor. The 1,2-dimethoxybenzene derivative lowered the hydrophobicity most significantly, as determined from calculated Log P values. These modified structures will soon be assessed to determine if the changes have improved the inhibitor potential of the drug and ultimately created a potential cancer drug candidate.

## Needs Assessment of the Catawba Indian Nation Senior Center

*Supported by a grant from the Winthrop University Research Council*

**Students: Ashley Eason, Rankin Fraedrich, Delanie Gaskill, Hannah Keenon, Jhane' Kirkland, Sharon Annie Jones, and M. Bianca Prescott**

Faculty Mentor: Allison Gibson, Ph.D.

CAS – Department of Social Work

This project was a joint partnership through a collaboration with Catawba Indian Nation Senior Center and the Department of Social Work. The student research team conducted a needs assessment with Catawba Indian Nation seniors (those 55 and older) related to their biopsychosocial needs to understand how to best serve seniors from this community. The purpose of this study was to inform Catawba Indian Nation Senior Center on how to best improve services for reservation-residing seniors to support them in maintaining independent living within their community. To complete the project, the student research team contacted 400 residents across Catawba Indian Nation's reservation for interviews. To collect data, the research team went door-to-door to residents' homes and invited them to participate in the survey. Once there, our research team interviewed participants using the "Identifying Our Needs: A Survey of Elders" instrument. If residents were not home, the research team followed up with them by phone and then by mailed survey with self-addressed return envelopes. When data returned from analysis, findings indicated seniors had unmet needs related to their diagnosed health conditions and opportunities for social participation. Members of the student research team then worked with Catawba Indian Nation Senior Center to implement intervention programs to increase education regarding managing chronic health conditions and programming to reduce social isolation.

## Stress and Daily Routine: How it Affects Athletes and Non-Athletes During an Injury Recovery Period

**Students: Holly Richardson, Anne Caldwell, and Corey Lewis**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

Injury recovery research is important to all people because the route to the swiftest recovery possible is beneficial knowledge for society. In this study, we examined if there is a significant difference in an injury recovery period between athletes and non-athletes. We specifically examined the constructs stress and daily activity. We hypothesized that athletes would have more stress and struggle more with daily activities. A convenience sampling strategy was used at a Southern liberal arts college and participants were given a survey about their experience during an injury recovery period. Participants were also recruited through the researchers' social media pages. There was no significant difference between athletes and non-athletes in regard to the construct stress. There was also no significant difference between athletes and non-athletes in regard to the characteristics of physical role functioning or social role functioning. We found that non-athletes have significantly higher vitality than athletes during an injury recovery period. Our hypothesis was partially supported because of the significant difference in vitality. This research suggests that there could be a more complex relationship between stress and mental toughness in athletes than previous research has discovered. It could also pave the way for research on injury recovery periods. If non-athletes have more vitality, this could affect the effectiveness of treatment.

## Student-Athlete Professional Development: Helping during Important Transitions

**Student: Carmen A. Rollizo**

Faculty Mentor: David Schary, Ph.D.

COE – Department of Physical Education, Sport, and Human Performance

(PESH 381 – Schary)

Student athletes are given some guidance on how to be successful academically and athletically while they are NCAA-eligible to be a part of the team. When they come in their first year at the school, they are normally assigned to be in study hall for a certain number of hours per week, to ensure that the student athletes have no reason to not be academically eligible to participate. The students can make good grades and perform exceedingly well on an elite level, and still not have jobs or careers when they graduate. These efforts are essential, but what about when the student athletes graduate? How do they become successful if all their time was spent in class or in practice? Each institution uses different approaches to assist with the transition. This literature review explains the successful and unsuccessful traits that have helped mold the professional development (or lack thereof) within an athletic department. Some of the articles included listed psychological themes that affect a student's transition.

## Through the Flames: From Accusation to Condemnation of Witchcraft through the Middle Ages

**Student: Sarah Edwards**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

Witchcraft is a key facet to understanding daily life after the “Big Death” during the Middle Ages. Folk practices took place long before the Middle Ages, as society struggled with survival after the constant invasions before 1000 C.E., the Great Famine, and the Big Death. Witchcraft was born out of the ashes of the pagan traditional superstitions; witchcraft developed over time into something more complex and came to be considered heresy. This paper will look at how this metamorphosis took place and the effects of all this change. By examining folk rituals, the role of the Church and secular courts, we can see how witchcraft affected the everyday lives of the people of the Middle Ages. A closer examination into white or “light” magic and black or “dark” magic will help to lay the basics in understanding the necromancy stance the Church would take by the time of the Inquisition. By understanding the deep-rooted past of witchcraft, we can follow the development from folklore to necromancy over time and the stance of the Church with accusation and inquisition.

## Determinants of Depression in Old Age

**Student: Carson Alicia Anne Shaffer**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

This paper elaborates on the key determinants of depression within the elderly population and to explore the effects of socioeconomic status (SES), gender, emotional support, and place of residence on elderly depression. The literature suggests that elderly with low SES and lack of emotional support are more likely to suffer from depression than the elderly with higher SES who are supported emotionally. I use data from the Behavioral Risk Factor Surveillance System (BRFSS 2015) and nested least squares multivariate regression models to estimate the effects of SES variables, emotional support and place of residence on the days depressed in the last month. The results indicate women spent on average more days depressed than males. And people with low and medium SES suffer on average more days depressed than people with high SES. Furthermore, elderly who lived in non-private residences are more likely to report more days depressed on average than those who lived in private residences or alone. My results also show that age, poor health, and being out of work play a role in the significance of depression within the American elderly. More research on the mechanisms leading to depression as well as the role of social support is needed to alleviate the severity of depression of the American elderly.

## Student Behaviors and their Effects on Student-Athlete Academic Performance

**Student: Jordan Stoddart**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

With data gained from an athletic involvement study at Northeastern University and Growth, Opportunities, Aspirations and Learning of Students in College (GOALS) key information is observed on the changes in student-athletes’ academic performance. Student-athletes typically devote time to athletics and academics, which requires balance in all aspects on their schedules. Several studies have found that self-initiated beliefs and motivations, such as passion, goal attainment, and self-determined motivation can positively contribute to student-athletes’ well-being by encouraging them to devote more effort to improving their performance, leading to greater achievement. In order to achieve this required balance and enhance their performance, student-athletes might face some sacrifices such as limiting their social life. In this study I tested if there is a significant change in academic performance for those student-athletes who are less likely to identify with the following behaviors: special treatment, drinking, going to parties, and attitude towards winning. I am controlling for scholarship status and race. Results indicate that social behavior of student-athletes is not related to their academic performance. However, special treatment has a positive effect on their academic performance.

## Mental Health Issues in LGBT Men who Have Experienced Intimate Partner Violence

**Student: Acton Broach**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

Many previous studies directed at the LGBT community involving intimate partner violence (IPV) measured rates of IPV among homosexuals alongside heterosexual rates. While comparison between these two groups is useful, it does not provide focused insight into possible variables unique to the LGBT community, which may affect IPV rates, as well as response to IPV itself. This study was conducted to explore possible correlation with internalized homophobia and intimate partner violence and how this affects one’s level of suicidality by type of abuse. I used survey data from Mental Health Concerns of Gay and Bisexual Men Seeking Mental Health Services, 2000 to conduct a multivariate analysis on the likelihood of suicidality amongst this population. This uses a dependent variable of suicidality, with independent variables of sexual abuse, emotional abuse, and self-esteem. Control variables include relationship status, age one came out as a member of the LGBT community, HIV status, and employment status. The results of this study showed no statistical significance between suicidality, abuse, or homophobia. The original data used is of a small sample size, and is intended for use in New England mental health facilities. A larger sample is needed to gain more information about the correlation between suicidality, abuse, and self-esteem.



## Hellish Influences: The Sources and Ideas that Drove Dante's *Inferno*

**Student: Richard Baisley**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

Dante Alighieri was born in 1265 and came of age in a politically torn Italy. In 1317, the first of Dante's *Divine Comedy, Inferno*, was completed. Since its publishing, the masterpiece has shaped culture and art and continues to stand as one of the most influential works of this time. The purpose of this paper will be to examine one of the major themes throughout the *Inferno*. Dante is very precise and creative with the layout of his Hell and the punishments his sinners endure, and this work will examine what effects medieval sources and older texts had on Dante's design of Hell as it corresponds to sin and punishment. Dante Alighieri, though as Catholic as they come, relies more on pagan sources such as Aristotle than contemporary medieval texts in the first book of his *Divine Comedy*, corresponding to his representation of the pilgrim going from a life of sin to the feet of God.

## The Effects of Child Support on Noncustodial Fathers: How Can the System Help Improve Their Economic Well-Being?

**Student: Jakarria C. M. Jackson**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

The objective of this paper is to inform the public of the hardship that child support brings upon noncustodial fathers, especially those in poverty, by using the Annual Social and Economic Supplement. The way child support is set up in certain states, for example, Indiana, causes low-income fathers to pay higher child support rates than high-income fathers. The guidelines need to be altered in such a way that child support is more reasonable for all recipients in the child support system to pay their obligations. My tested hypothesis which I failed to reject was that high child support orders would negatively affect the economic well-being of low-income, noncustodial fathers and that these fathers will have difficulties in making their full payments. Indeed, my results have proven that noncustodial fathers who were below the poverty level were more likely to make partial payments rather than obligated full payments. More specifically, young, unmarried African Americans with little to no education were less likely to comply with their child support orders. To increase the compliance rate of noncustodial fathers, programs need to be formed in which these fathers are educated on how child support works and its purpose. The child support system needs to be more focused on whether noncustodial fathers can pay rather than their willingness to pay. Noncustodial fathers need help just like custodial mothers and children.

## Transcriptional Regulation by NUR of *nikM*, *nikA*, *sodF*, and *sodF2* genes in *Streptomyces coelicolor*

**Student: Augustine Vinson**

Faculty Mentor: Nicholas Grossoehme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The bacterium *Streptomyces coelicolor* contains a nickel uptake regulator (NUR) that regulates *nikM*, *nikA*, *sodF*, and *sodF2* genes found in *Streptomyces coelicolor*. The transcriptional regulation efficacy by NUR can be established by analysis of gene expression in *nikM*, *nikA*, *sodF* and *sodF2* genes. To analyze gene expression in these genes, quantitative real time PCR can be used, along with fluorescence analysis from green fluorescent protein (GFP). BamHI was used for integrating GFP into the pSET 152 plasmid, by restriction digestion and ligation processes; *Streptomyces coelicolor* genes that contain GFP resulted. GFP-containing *Streptomyces coelicolor* cell samples will then be cultivated in differing conditions by varying nickel concentrations from 20 nM to 1 nM. Quantitative real time PCR will then be used to investigate NUR's transcriptional regulation in terms of the different nickel concentrations in which *Streptomyces coelicolor* cells were cultivated. The GFP in the *Streptomyces coelicolor* DNA will allow that *nikM*, *nikA*, *sodF* and *sodF2* genes be analyzed in terms of fluorescence levels that are affected by the varying concentration levels of nickel in the cultivation conditions for *Streptomyces coelicolor* cells; this will indicate transcription regulation efficiency of NUR.

## Effects of Physical Activity on Depression in Adolescents

**Student: Anthony Paulsen**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

Depression is a mental health issue that typically forms during adolescence and continues throughout adulthood. Recent research indicates that the levels of depression on U.S. youth are on the rise. This paper examines whether physical activity, changes in body weight, self-perception of weight, family and school involvement, housing, resident environment, and feelings of safety at home affect short-term and medium-term depression. I used data from the National Longitudinal Study of Adolescent to Adult Health and nested ordinary least square regressions to estimate the effects of each variable on the number of days reported being depressed in the last month and the last week. Estimated coefficients indicate that changes in body weight, self-perception, learning about stress, and school safety are statistically significant risk factors for depression; but these variables have different effects for medium- and short-term depression. Unfortunately, the number of violent events in school settings is on the rise. More research needs to be conducted on the link between depression and learning environments in U.S. schools and institutions of higher education.



## Determinants of Internet Use among Adolescents in Europe: Does Parental Mediation Matter?

**Student: Zachary Steppenwolfe Wiley**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

Using data from the 2010 EU Kids Online survey, I answered the question of what affects internet usage among children ages 9-16. I looked at the regional differences, the differences in socioeconomic status (SES) and education, and the effects of parental mediation on internet usage. I used bivariate analysis, correlation coefficients, and ordinary least squares to see if there were significant relationships between countries, SES, education, and the different forms of parental mediation. I concluded that there were no significant differences in internet use based on country, but that there were significant differences in internet use based on SES, education, and the different forms of parental mediation. This research is important because of how fast the internet is growing, and there should be more research in the future.

## Does Being a Victim of Bullying During Childhood Lead to the Use of Drugs in Adulthood?

**Student: Rhonsha J. English**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

Being a victim of bullying can have a major impact on an individual over time. Although there are resources available to cope with bullying, many individuals are not comfortable confronting their problems or seeking help. Being a victim of bullying could lead to psychological and physical problems. The goal of this research is to see if there is a connection between individuals being victims of bullying during their childhood and their use of drugs in adulthood. Univariate and bivariate links between bullying and drug use were examined based on a longitudinal sample of youth in 1997. Childhood bullying had a unique connection to the use of drugs in adulthood. I would recommend that this topic continue to be researched, so programs could be implemented in schools during childhood so a child would know how to deal with bullying and the problem could be under control before reaching adulthood. As hypothesized, many victims of bullying throughout their childhood retreated to the use of drugs during adulthood.

## Contextual Factors That Mediate the Relation between Poverty and Drug Use

**Student: Taylor Walton**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

Merton's goals-means Gap Theory stated that social structures and differences in the distributions of resources could pressure citizens to engage in deviant behavior. To test this theory, I used the variables drug use and alcohol use to determine if deviant behavior is associated to conditions in neighborhoods (presence of gangs) and households (poverty and household composition). I used data from the National Longitudinal Survey of Youth 1997 (NLSY97) to test whether young individuals are more likely to engage in deviant behavior when there was high prevalence of gangs in neighborhoods, they received food stamps, or lived in fractured households. Results indicate that alcohol use is positively associated with presence of gangs in the neighborhood, but not with poverty or household composition. Moreover, marijuana use is not associated with any of the three risk factors studied. Future research should explore retreatism more specifically as the consumption of alcohol and variety of drugs seem to respond to different risk factors.

## Attitudes Toward Police: The Impact of Race and Ethnicity

**Student: Benjamin Murphy**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

This paper analyzes the perceptions of people who have had encounters with police officers. The paper centers on looking at the magnitude of the differences in satisfaction with the police during specific encounters by the race and ethnicity of the respondent. I used data from the Police Public Contact Survey, or PPCS, and ran the data collected through a multivariate logistic regression. In the models, I estimate the differences on satisfaction with police performance for non-Hispanic Whites, African Americans, Hispanics and Asians. My model controls for age, education, employment and gender. Results indicate that there is a statistically significant difference between African Americans, Whites, Hispanics and Asians with regards to their perceptions about the police.

## Ramifications of Armed Conflict on the Economy

**Student: Sydney Cox**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

Armed conflict remains a serious problem for every region in the world and particularly for those less developed. For this reason, this paper studies the effect of conflict on economic output. I used the Penn World Table and Correlates of War from 1961 to 2014 for Syria, Sri Lanka, Iran, Iraq, and the United States. Variables studied included Gross Domestic Products, employment, armed conflict, and population of countries. The armed conflict variable was broken down into three different levels of intensity so that results could be explained more efficiently and so that interpretations could be made accessible for countries to allow them to be better equipped. The results indicate that there is a high positive correlation between employment, population and GDP when it comes to intensity levels of armed conflict. It is important to research and learn more about the effects of war so that in the future countries can be prepared for the aftermath.

## The Ultimate Mystery Story

**Student: Peter T. Heil**

Faculty Mentor: Peter Judge, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 316 – Judge)

One of the most debated topics in the history of the Christian Church is grace. So many scholars, theologians, and sects of Christianity had different opinions which shaped Christian doctrine. These ideas, such as Augustine's, Pelagius', and the Donatist's, should be compared with biblical scripture to discover if their doctrine coincides with biblical doctrine. This paper lays out the doctrine on grace of key theologians and scholars and then compares said doctrine with passages in biblical scripture. The results found contradictions and concurrences with biblical passages in each doctrine. This paper offers, through comparison of biblical scripture and later doctrine, a more educational understanding of grace and its full nature.

## Parenting Styles and Criminal Behavior: Do They Matter?

**Student: Justice Graham**

Faculty Mentor: María Aysa-Lastra, Ph.D.

CAS – Department of Sociology and Anthropology

The purpose of this research project was to evaluate the relations between parenting styles and criminal behavior such as drug trafficking. I used data from the National Longitudinal Survey of Youth 1997 (NLSY97) to test if individuals would engage in criminal behavior such as selling drugs based on their parenting style. In addition to the parenting styles, I also considered peer pressure, family structure, and gang participation. I hypothesize that parenting styles do matter if a child engages in criminal behavior.

## Pope Innocent III: The Greatest Warrior of Christ

**Student: Andrew Colboth**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

In 1963, James M. Powell gathered a collection of works on Pope Innocent III to see what scholars thought about him. He titled the work *Innocent III: Vicar of Christ or Lord of the World?* This title is the framework for my research. Powell's purpose was to gather varying opinions about Innocent III so that the reader could decide for himself whether Innocent III was a Vicar of Christ, or a power-hungry Pope. Using various decrees from Innocent III himself, a biography from an anonymous member of the church who personally knew Innocent, and documents from rulers of the time regarding Innocent III, I argue that Innocent III was in fact a Vicar of Christ. However, he also needed to be the "lord of the world" to save as many people's souls as he possibly could.

## Joan of Arc: Falsely Accused

**Student: Ashton Morgan**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

Joan of Arc is a widely known popular historical figure. At age 13, she began hearing angels calling to her, which led to her historic part in the Hundred Years War. Joan was put on trial for many charges, the worst charge being heresy. Numerous copies of Joan's trial still exist and have been translated from their original French and Latin copies. This paper sets out to uncover if Joan's trial was consistent with other trials of the time or if she was treated differently because of who she was. Using these trial records this paper will also explore inconsistencies, Inquisition interrogation tactics, and political agendas that may have led to Joan of Arc being falsely accused. Not only was she accused of being a heretic, but she was found guilty and sentenced to death. Hundreds of years after being burned at the stake, Joan of Arc was canonized as a saint, making us question more if she was wrongly accused.

## The Black Death

**Student: Hunter Bowers**

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 590 – Bell)

The topic for this paper will be the disease that goes by many names, but is properly known as the Black Plague. In this discussion we will try to recognize what the true killer was of this plague. With the lack of technology and understanding of how diseases worked, there was no knowledge of what caused the disease. What did people at this time think about the Plague and how did it affect different areas of Europe? Did different areas have different perceptions of the cause or did they share the same one, and was anybody trying to find a cure instead of point the blame? The Black Death was one of the most deadly plagues not only because of how fast it would kill, but because of how people attempted to fix it or were quick to point the blame on those who needed the most help.

# EAGLE STEM SCHOLARS

Winthrop University's Eagle STEM Scholars Program merges the campus' commitment to undergraduate research and promoting the success of students from groups that have been historically underrepresented in the sciences. Biochemistry, biology, chemistry, mathematics, computer science, human nutrition, and environmental science majors receive the academic support and research training needed to pursue doctoral studies in either health professions or life sciences. Student support services are modeled after the nationally acclaimed Meyerhoff Scholars Program at the University of Maryland Baltimore County, and employ the nation's best practices in STEM training and student retention (e.g., an intensive summer bridge experience, rigorous curricula in science and mathematics, academic monitoring, intramural and extramural research experiences, and career guidance). Since its inception, the program has served 106 Winthrop students. Eagle STEM Scholars have successfully competed for top positions in graduate and medical programs, with several Eagle STEM alumni at top institutions such as MUSC, Notre Dame, Virginia Tech, University of Maryland, University of Florida, UCLA, and Duke University.

Eagle STEM Scholars are recruited to Winthrop based on their outstanding academic performance and potential to pursue doctoral degrees. Each year, the Eagle STEM Advisory Board selects the members of each cohort. These incoming freshmen take full advantage of the program and later distinguish themselves as winners of national awards.

We are grateful for the support of the Advisory Board, the research mentorship by Winthrop faculty, and the broader Winthrop community for its ongoing support of this excellent program.

## 2016-2017 Eagle STEM Advisory Board:

- Cliff Harris, Ph.D., Assistant Director, Eagle STEM Scholars Program and Assistant Professor of Chemistry
- Rachel Law, B.S.Ch.E., Director, Eagle STEM Scholars Program
- Pat Owens, Ph.D., Chair, Department of Chemistry, Physics, and Geology
- Julian Smith, Ph.D., Professor of Biology
- Kathie Snyder, Ph.D., Assistant Professor of Chemistry
- Takita Sumter, Ph.D., Provost Faculty Fellow and Professor of Chemistry
- Kristi Westover, Ph.D., Professor of Biology
- Michael Whitney, Ph.D., Director, Digital Information Design Program and Assistant Professor of Computer Science

## The following Eagle STEM Scholars submitted abstracts on their work for inclusion in this compilation:

- |                       |                   |
|-----------------------|-------------------|
| Aaron Anderson-Rolfes | Julia Poppell     |
| Sommer Barber         | Jake Roberts      |
| Michelle Corley       | William Schreiber |
| Madeline Diaz         | Hunter Sellers    |
| Douglas Johnson       | Mikala Smith      |
| Autumn Leggins        | Leigha Stahl      |
| Victoria Leroy        | Jessica Stevens   |
| Jordan Lewis          | Michala Tesney    |
| Theresa Melendez      | Augustine Vinson  |
| Davis Plasko          | Emily Watson      |



# McNair Scholars

The Winthrop McNair Scholars Program prepares outstanding first-generation, low-income, and underrepresented undergraduates to be successful in Ph.D. programs through research experience, workshops, GRE and graduate school application preparation, and travel to present research and explore graduate programs.

Winthrop's program is funded by a five-year renewable U.S. Department of Education TRiO Ronald E. McNair Post-Baccalaureate Achievement Program grant. \$226,600 in federal funding is provided each year to help 30 eligible students complete research and prepare for graduate study. In 2016-2017, federal funds represent approximately 72% of program costs. Winthrop and the Winthrop Foundation contribute the remaining 28% of the budget in cash and in-kind matches. For more information about the program, please visit <http://www.winthrop.edu/mcnair>.

Being a McNair Scholar is a prestigious, nationally recognized honor. Scholars are actively recruited by graduate schools across the country and the majority of McNair alumni enroll in graduate programs immediately. Universities where our alumni are currently completing Ph.D.s include Duke, Colorado State, Georgia Tech, Illinois, Indiana, Northeastern, Virginia Tech, and Wake Forest Universities and the Universities of Colorado, Illinois, Notre Dame, South Carolina, and Utah.

Each year, the twelve-member Winthrop McNair Advisory Board selects new Scholars through a highly competitive application and interview process. All McNair Scholars complete intensive summer research internships, and several have earned awards for their work. See <http://digitalcommons.winthrop.edu/mcnair/> for some of our Scholars' work.

## 2016-2017 Winthrop McNair Advisory Board Members

Adolphus Belk, Ph.D., Professor of Political Science

Tyrone Ceaser, Ph.D., Assistant Professor of Exercise Science

Heather Evans-Anderson, Ph.D., Associate Professor of Biology

Cheryl Fortner-Wood, Ph.D., Director, McNair Scholars Program and Professor of Psychology

Rose Gray, M.A., Director, TRiO Student Support Services (SSS) Program

Wenonah Haire, D.M.D., Executive Director, Catawba Cultural Preservation Project

Gloria Jones, Ph.D., Dean, University College

Willis Lewis, Ph.D., Associate Professor of Economics

Karen Stock, Ph.D., Professor of Fine Arts

Takita Sumter, Ph.D., Professor of Chemistry

Will Thacker, Ph.D., Professor of Computer Science

Bradley Witzel, Ph.D., Professor of Education

## Winthrop McNair Staff and Mentors support the Scholars before, during, and after the summer research experience.

Dr. Cheryl Fortner-Wood, Director

Mrs. Barb Yeager, Executive Support Specialist

Mrs. Amanda Cavin, Graduate Associate

Ms. Stephanie Bartlett, Head Writing Coach

Dr. Matt Hayes, Stats and Methods Coach

The following Winthrop McNair Scholars participated in the 2016 Winthrop McNair Summer Research Experience from May 11 – July 1, 2016. They presented their research at the S.C. TRiO McNair Research Symposium on June 22, 2016, hosted by the University of South Carolina TRiO McNair Program. These students also presented their research at the Southeastern Association for Equal Opportunity Programs and Personnel (SAEOPP) McNair/SSS Scholars Research Conference and competed with fellow Scholars from all over the country. Ordinals listed in parentheses [e.g., (1st)] mark students whose presentations earned first-, second-, or third-place honors in their SAEOPP categories.

**Naseem Adkinson-Jobe**, *Mentor: Stephanie Lawson, Ph.D.*  
Collector's Relationship to Access-Based Consumption: A Sneakerhead's Perspective (Poster)

**Cera Crowe**, *Mentor: Padmini Patwardhan, Ph.D.*  
Business Sustainability: An Analysis of Three Enterprises in Charlotte, North Carolina (Oral - Social Science)

**Maddie Diaz**, *Mentor: Takita Sumter, Ph.D.*  
Investigation of the HMGA1/EF24 Nexus in Human Colon Cancer (Oral – Life Science)

**Jesse Grainger**, *Mentor: Brent Cagle, Ph.D.*  
"I Don't Fit in a Box, No One Does." Intersectionality and Homeless Identity (Oral - Social Science)

**Elizabeth Lambert**, *Mentor: Adriana Cordis, Ph.D.*  
Whistleblower Laws and Corporate Fraud in the United States (Oral - Social Science)

**Autumn Leggings**, *Mentor: Nick Grosseohme, Ph.D.*  
Controlling the Expression Levels of Oct4 in Murine Adipose Derived Stem Cells Using Invitrogen's Gene Switch™ System (Oral - Life Science)

**Nicole McMullen**, *Mentor: Heather Evans-Anderson, Ph.D.*  
Targeted Mutagenesis of FOXO Transcription Factors in the Model Organism *Ciona intestinalis* Utilizing the CRISPR/Cas9 System (Oral - Life Science)

**Lesley Peña (1st)**, *Mentor: Darren Ritzer, Ph.D.*  
Mindfulness, Coping, and Stress Levels among Different Races (Poster)

**Savannah Pewett**, *Mentor: Merry Sleight, Ph.D.*  
Police Perceptions across Ethnicities and Cultures (Poster)

**Holly Rittenberry**, *Mentor: Joni Boyd, Ph.D.*  
The Relationship of Lower Body Flexibility and Stress on the Ulnar Collateral Ligament in High School Baseball Players (Oral – Health)

**Claudia Salazar**, *Mentor: Merry Sleight, Ph.D.*  
Adults' Cognitive and Emotional Reactions to Self-Reported Stereotype Experiences (Poster)

**Tollie Schultz**, *Mentor: Tara Collins, Ph.D.*  
Masculinity and Femininity as Predictors of Emotional Expressivity and Relational Attachment (Oral - Social Science)

**Jálen Smith**, *Mentor: Brad Tripp, Ph.D.*  
Examining Longitudinal Data of Juvenile Delinquents in Rock Hill, South Carolina (Poster)

**Shannon Snelgrove**, *Mentor: Laura Gardner, Ph.D.*  
Contemporary Black Women Artists' Narratives (Poster)

**Shayla Warren (2nd)**, *Mentor: Maria Aysa-Lastra, Ph.D.*  
Associations between Perceived Discrimination on Subjective Quality of Life among Adults in the U.S. (Oral - Social Science)

**Camerun Washington (1st)**, *Mentor: Kathryn Kohl, Ph.D.*  
Investigating X Chromosome Non-disjunction in *Drosophila melanogaster* su(var)3-9 mutants (Oral - Life Science)

**Alexis Williamson**, *Mentor: Brad Witzel, Ph.D.*  
Implementation of Resilience in Children of Low Socio-Economic Status (Oral – Education)

# OFFICE OF NATIONALLY COMPETITIVE AWARDS (ONCA)

Winthrop University's Office of Nationally Competitive Awards (ONCA) identifies and assists highly motivated and talented students in applying for nationally and internationally competitive awards, scholarships, fellowships, and unique opportunities, both at home and abroad. ONCA gathers and disseminates award information and deadlines across the campus community, and serves as a resource for students, faculty, and staff throughout the nationally competitive award nomination and application process.

The ONCA Celebration of Applicants is an annual event recognizing the difficult and rewarding challenge taken on by Winthrop University students to apply for some of the most prestigious scholarships in the nation and the world. Win or lose, the process of personal reflection required to complete the application for a nationally competitive award is often transformative in a student's life and can be as important as the outcome.

Scholars who applied for these prestigious awards spent countless hours writing and revising personal statements, policy and research proposals, essays, resumes, and answers to "short answer" questions on application forms (which are never short, and always challenging). In the process, I hope each student learned a little more about him- or herself and his or her goals. Scholars, I'd like to acknowledge and applaud your hard work and say how much I enjoyed getting to know each of you this year.

In addition to recognizing the work of each of our ONCA Scholars, I would like to thank each and every member of the Winthrop University community who has given a student an encouraging word, recommended a student for ONCA in person or through the online interim reporting system established by Dean Gloria Jones, brought an ONCA presentation into the classroom, participated in an award selection or mock interview committee, or served on the ONCA Advisory Board. I would especially like to thank members of Winthrop faculty and administration who have written letters of recommendation for our students this year: this is an arduous undertaking, often resulting in two- to three-page letters full of descriptive detail about our students, their capabilities, and their potential. For all of your time and effort, your students and I thank you.

## Leslie Bickford, Ph.D.

Assistant Professor of English  
Director, Office of Nationally Competitive Awards (ONCA)  
Winthrop University

## Award Nominees and Winners, 2016-2017

**Alpha Psi Omega Scholarship:** Each year, the National Officers of Alpha Psi Omega/Delta Psi Omega will select two recipients of Alpha Psi Omega/Delta Psi Omega Scholarships, each in the amount of \$1,500, to be used by the recipient to further her/his education and/or professional goals in theatre.

Winthrop University Nominee: Lauren Roberts (**Pending**)

**Ashley Soule Conroy Foundation:** The Foundation has been created to provide scholarships for travel and study abroad. Scholarships in the amount of \$3,000 are awarded each semester to students planning to study abroad.

Winthrop University Nominee: Sydney Haboush

**Benjamin A. Gilman International Scholarship Program:** The Gilman Program awards 2,300 scholarships of up to \$5,000 per academic year for U.S. citizen undergraduate students of limited financial means to pursue academic studies abroad. Such international study is intended to prepare U.S. students to assume significant roles in an increasingly global economy and interdependent world.

Winthrop University Nominee: Sara Abouissa (**Pending**)

Winthrop University Nominee: Nabil Clemons-El (**Pending**)

Winthrop University Nominee: Kayla Grant

Winthrop University Nominee: Cole Heatherly

Winthrop University Nominee: Cheyenne Walsh (**Pending**)

Winthrop University Nominee: Beth West (**Pending**)

**Boren/National Security Education Program (NSEP):** The National Security Education Program (NSEP) provides a unique funding opportunity for U.S. students to study world regions critical to U.S. interests (including Africa, Asia, Central & Eastern Europe, Eurasia, Latin America & the Caribbean, and the Middle East). NSEP provides scholarships to U.S. undergraduate students for study abroad in world areas critical to U.S. National Security. Recipients are obligated to work either for an office or agency of the federal government involved in national security affairs, or in higher education. NSEP is merit based. The maximum NSEP Boren Scholarship award is \$8,000 for a summer, \$10,000 for a semester, and \$20,000 for an academic year.

Winthrop University Nominee: Julia Poppell (**Pending**)

Winthrop University Nominee: Jordan Reilly (**Pending**)

**Chi Omega Humphreys Award for Study Abroad Scholarship:** Dedicated to helping young people pursue their academic and career goals through the experience of study abroad.

Winthrop University Nominee: Beth West (**Pending**)

**Fulbright Award for Study/Research or Teaching English Abroad:** Among the most widely recognized academic honors, Fulbright awards provide support for graduate students and young professionals to study abroad. Awards include full grants for an academic year of study or research, travel grants, and teaching assistantships in English.

Winthrop University Nominee, English Teaching Assistant Abroad: Anna Bello

Winthrop University Nominee, Graduate Studies Abroad: Kyle Bruenning

Winthrop University Nominee, English Teaching Assistant Abroad: Anne Cushman (**Finalist, Pending**)

Winthrop University Nominee, English Teaching Assistant Abroad: Ashley Jackson

Winthrop University Nominee, English Teaching Assistant Abroad: Gabriel Paxton

**Fund for Education Abroad:** (FEA) was established in 2010 to address the need for an independent study abroad scholarship provider. FEA is expanding access to study abroad by raising awareness of its benefits to the individual and value to the collective, and by granting scholarships of up to \$10,000.

Winthrop University Nominee: Jordan Reilly (**Pending**)

Winthrop University Nominee: Beth West (**Pending**)

**The Mitchell Scholarship** provides tuition and room for study at one of several institutions of Ireland and Northern Ireland. A stipend to cover additional expenses and a travel stipend are also provided.

Winthrop University Nominee: Gabriel Paxton

**National Science Foundation Fellowships:** The purpose of the National Science Foundation's Graduate Research Fellowship Program is to ensure the vitality of the human resource base of science and engineering in the United States and to reinforce its diversity. The program recognizes and supports outstanding graduate students in the relevant science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees, including engineering and computer and information science. NSF Fellows are expected to become knowledge experts who can contribute significantly to research, teaching, and innovations in science and engineering.

Winthrop University Nominee: Leigha Stahl

**National Society for Collegiate Scholars Study Abroad Award:** NSCS offers (2) \$2,500 scholarships to members studying abroad during the spring or fall semester.

Winthrop University Nominee: Sydney Haboush

**Pat Tillman Foundation Scholarship:** Founded in 2008, the Tillman Scholars program supports our nation's active-duty service members, veterans, and military spouses by investing in their higher education. The scholarship covers educational expenses, including tuition and fees, books and living expenses, but scholars receive much more than just funding. The program unites the best talent and leadership in the military to make a significant impact in the fields of medicine, law, business, policy, technology, education, and the arts.

Winthrop University Nominee: Patrick Craven (**Pending**)

**Phi Kappa Phi Graduate Fellowship:** Every year, the Honor Society of Phi Kappa Phi awards 57 Fellowships of \$5,000 each and three of \$15,000 each to members entering the first year of graduate or professional study. Each Phi Kappa Phi chapter may select one candidate from among its local applicants to compete for the Society-wide awards.

Winthrop University Nominee: Steven Patrick (**Pending**)

Winthrop University Nominee: Kelly Scott (**Pending**)

**The Public Policy and International Affairs Program:** The PPIA Fellowship Program is designed to prepare college juniors or rising seniors from diverse backgrounds for graduate studies in public and/or international affairs and groom them for professional roles in public service. Recipients are provided full tuition to attend the PPIA Junior Summer Institute, a minimum \$1,000 stipend, and at least \$5,000 toward graduate school tuition.

Winthrop University Nominee: Sydney Haboush (**Pending**)

**Phi Kappa Phi Study Abroad Scholarship:** Phi Kappa Phi Study Abroad grants are designed to help support undergraduates as they seek knowledge and experience in their academic fields by studying abroad. Thirty-eight \$1,000 grants are awarded each year.

Winthrop University Nominee: Cheyenne Walsh (**Pending**)

**Rhodes Scholarship:** The Rhodes is one of the most competitive and prestigious awards available to students in the world. It includes all fees, travel expenses, and a yearly stipend for two years of study at Oxford, with a possible renewal for a third year. Thirty-two Rhodes Scholars are awarded annually; winners must undergo interviews at the state and regional level.

Winthrop University Nominee: Anne Cushman



**Sunbelt Rentals Scholarship:** In partnership with the Big South Conference, Sunbelt Rentals established the Sunbelt Rentals Scholarship as a means of recognizing the work done in the classroom, campus, and community by students within the Big South Conference. Two (2) scholarships will be awarded in January at a value between \$2,000 and \$4,000 each. A committee made up of Big South Conference administrators, Sunbelt Rental executives, and institutional representatives from the Big South Conference institutions will be responsible for determining the award.

Winthrop University Nominee: Lauren Roberts

**Teaching Assistant Program in France:** TAPIF offers the opportunity to work in France for seven months, teaching English to French students of all ages. Each year, over 1,100 American citizens and permanent residents teach in public schools across all regions of metropolitan France and in overseas departments of French such as Guiana, Guadeloupe, Martinique and Réunion.

Winthrop University Nominee: Jennifer Moxley (**Pending**)

**Tortuga Backpacks Study Abroad Scholarship:** Tortuga Backpacks sponsors a \$1,000 scholarship for students wishing to study abroad.

Winthrop University Nominee: Mercedes Evanofski (**Pending**)

**Truman Scholarship:** The Truman Scholarship provides up to \$30,000 in funding to students pursuing graduate degrees in public service fields. The foundation also provides assistance with career counseling, internship placement, graduate school admissions, and professional development. The Truman Scholarship assists future leaders in public service and government with funding for the senior year of undergraduate study and two or three years of graduate study.

Winthrop University Nominee: Gabrielle Lee

**University Studies Abroad Consortium:** USAC awards over \$1 million in scholarships and discounts each year to assist students with their study abroad expenses.

Winthrop University Nominee: Sara Abouissa (**Pending**)

## Meet Some Applicants:

**Nabil Clemons-El** is a sophomore international business major. He applied for the Gilman Study Abroad Scholarship and plans on studying in Costa Rica for the fall semester. Nabil is a non-traditional student and military veteran.

**Anne Cushman** is a senior English major who applied for the Fulbright and Rhodes Scholarships. She plans to attend graduate school to continue her studies of English literature and composition. She is a member of the Winthrop women's soccer team, a Peer Mentor, and officer of Sigma Tau Delta English Honor Society.

**Gabrielle Lee** is a junior social work major who applied for the Truman Scholarship. After she graduates with a Bachelor of Social Work degree, she hopes to attend graduate school to receive her Master's in Social Work with an emphasis in child welfare. After graduate school, she either wants to join the Peace Corps or work for a child welfare agency. Gabrielle is currently involved in Omicron Delta Kappa, the Women's Multicultural Collective, and the Literacy Intervention Team.

**Gabriel Paxton** is a senior majoring in political science. He applied this fall for the George Mitchell Fellowship and the Fulbright. His plans for the future are to attend graduate school in Central Europe, and hopefully establish roots there in an academic career.

**Elisabeth West** is a junior political science major who applied for the Chi Omega Humphreys Award for Study Abroad and the Gilman Study Abroad Award. She plans to study abroad next fall in Dublin and, after graduation in the spring of 2018, to continue serving as a bureaucrat with the National Institutes of Health. She is currently the student body president and has been extremely active in student activities and Greek life since she has been at Winthrop. She has worked for *The Johnsonian*, the athletics department, and the Academic Success Center. Through her leadership involvement, she won the Williamson Leadership Award last spring, and has continued to serve the Winthrop community.

# WINTHROP INITIATIVE FOR STEM EDUCATORS (WISE) SCHOLARS AND INTERNS

The Winthrop Initiative for STEM Educators (WISE) program is supported by a \$1 million grant through the National Science Foundation's Robert Noyce Scholarship Program. The primary focus of WISE program efforts is to recruit, support, and mentor science and mathematics majors choosing to pursue teaching as a career. The program currently has two primary outreach activities. The WISE Scholars are graduate and undergraduate students committed to teaching in high-need schools; they are provided scholarship funds, connections to state and national organizations for STEM teachers, opportunities for conference participation, additional mentoring, and access to STEM education resources on campus. The WISE Interns are first- and second-year Winthrop and York Technical College students pursuing STEM degrees. These students participate in a summer program that explores research in a disciplinary group, engages in local schools for service learning, and promotes the formulation of individual research questions for more extensive investigation through a variety of other avenues.

**The following WISE Interns and/or Scholars submitted abstracts on their scholarly work for inclusion in this compilation:**

Lindsay Bradley

Michelle Corley

Tianee Harris

Savannah Moritzky

Julia Poppell

Brent Shuman

Mikala Smith

Leigha Stahl

Michala Tesney

Camerun Washington

# STUDENT INDEX

Abouissa, Sara 82, 84	Braswell, Maria K. 55	Castro, Angel 73	Dixson, Sara P. 21, 27
Adams, Olivia 57	Brazel, Amari 37	Caulder, Elon 67	Doar, Annie 57
Adkinson-Jobe, Naseem A. 22, 81	Brewer, Autumn S. 21, 27	Chandler, Tucker 29	Dodd, Katelyn G. 12
Agoris, Christine 54	Briggs, Ashley S. 29	Chapman, Khayla 60, 63	Donnelly, Sara 57
Almond, Emily 7	Broach, Acton 74	Chavis, Jonathan 66	Draper, Asia Nicole 49
Amodio, Sydney 31	Broach, Shelbie A. 21, 27	Cheesborough, Caroline 31	Drayton, Cameron 67
Anderson, Alayna 18	Brooks, Ryan 55	Chewning, Chris 69	Driscoll, Garrett J. 43
Anderson-Rolfes, Aaron B. 54, 79	Brown, Christopher 57	Claytor, Margaret L. 71	Dunlop, Saige M. 54
Andorfer, Molly 66	Brown, Corrina 11	Clemons-El, Nabil 82, 84	Dunphy, Katherine 72
Arioli, Ryan M. 28, 35	Bruening, Noah 66	Clift, Courtney 64, 65	Dyches, Alyvia 61, 62
Arledge, Katelyn 69	Bruenning, Kyle 83	Cobb, Kaitlin 51	Eason, Ashley 73
Asbury, Amy L. 71	Brugh, Jessica M. 39	Coffey, Julie 30	Eastham, Anna Laine 30
Baisley, Richard 75	Brunson, Aerial 50	Colboth, Andrew 77	Economy, Phyllis 20, 42
Baker, Waverly 18	Buff, Mykah 30	Cook, Ashley 1, 2	Edwards, Drew 57
Barber, Sommer 41, 79	Bullard, Brittany 42	Corbeels, Camille 32	Edwards, Kellsie 16
Barr, Melissa 23	Burdette, Victoria 26	Corder, Alex 12	Edwards, Sarah 74
Barrie, Mariah 69	Burger, Madison 57	Corley, Michelle 15, 79, 85	English, Rhonsha J. 76
Bartle, Cady 50	Burgin, Karis 64	Corteville, Hillary 64, 65	Ernst, Nicole Rose 66
Beatson, Nicole 51	Burroughs, Delayna 38	Costello, Olivia 52	Estes, Edie 57
Beauvais, Meagan 57	Byrne, Caitlin 69	Cox, Sydney 77	Evanofski, Mercedes 84
Bello, Anna 54, 83	Byron, Brandon 38	Craven, Patrick 83	Farrell, Destiny 53
Benoit, Tessa 57	Byron, Danny 57, 61, 62	Crimi, Mallory 17	Feldman, Deborah 51
Berchtold, Claire 38	Caldwell, Anne 73	Crosby, Kennedy 68, 69	Ferrell, Rebie Mae 40
Bishop, Courtney 42	Cannon, Cody 57, 59	Crowe, Cera T. 9, 81	Fey, Keaupono K. 39
Black, Margaret Arielle 11, 45	Cantrell, Kathryn L. 19	Croy, Alexis 66	Ford, DeVon 60, 62
Booth, Joseph 66	Capozzola, Angelina 41	Cullum, Leire 34	Fore, Brittany 32
Bos, Marlee 42	Carpenter, Callan Gaines 64, 65	Cummings, Jobina 69	Fraedrich, Rankin 73
Bowers, Hunter 78	Carpenter, Dylan 67, 69	Cunningham, Nicholas A. 10, 47, 72	Freudenberger, Chandlee 57, 61, 63
Bowman, Garrett 60	Carr, Sydney 54, 68	Cushman, Anne T. 13, 83, 84	Fuller, Becky 61, 62
Bradley, Lindsay K. 14, 85	Carter, Samuel 57	Da Nobrega Garcia, Alice 51	Furr, Shelby 60, 63
Bradley, Natalie 68	Castellanos, Ana Karen 41, 44	Davis, Brittany 25	Gadsden, Dominique 57
Branagan, Vicki 57	Castleman, Henley 23	Davis, Brooke 41, 71	Gaskill, Delanie 73
		Davis, Casey 42	Gervais, Anna 64
		Davis II, Christopher 68	Goodwin, Jayma L. 50
		Davis, Sierra T. 21, 27	Gordon, Eva 57
		Dean, Anthony 64	Graham, Ashley 35
		Diaz, Madeline 41, 79, 81	Graham, Justice 77

Grainger, Jesse L. 43, 81	Jessup, Hannah 66	Leonard, Hannah 54	Moore, Amy 30
Grant, Cameron 55	Johnson, Courtney 64, 65	Leroy, Victoria 14, 79	Morgan, Ashton 78
Grant, Kayla 82	Johnson, DesiRee 25	Lewis, Corey 73	Moritzky, Savannah A. 16, 85
Green, Heather C. 21	Johnson, Douglas 27, 79	Lewis, Eric 31	Morrison, Eric 64
Groves, Justin A. 16	Johnson, Elizabeth 57	Lewis, Jordan 17, 79	Mosher, Vanessa 17
Guild, Anna 70	Johnson, Kristen A. 51	Lewis, Shelby 68	Mowery, Katherine Hunter 31
Haboush, Sydney 82, 83	Johnson, Markayela 23	Lindler, Shelby 66	Moxley, Jennifer 84
Haley, Richard 30	Jones, Amber 69	Long, Megan 68, 69	Mseis, Natalie 25
Hamilton, Taylor 18	Jones, Lamonica J. 43	Lowers, Morgan 32	Murphy, Benjamin 76
Harris, Tianee 36, 37, 85	Jones, Shabreccia 56	Lusk, Julia A. 14	Murray, Chrisa 66
Hartness, Brady 66	Jones, Sharon Annie 73	Mace, Phylisha 67	Myers, Iris 68
Hawes, Steven 64	Jordan, Christopher J. 47	Maghakian, Anne Marie 49, 56	Nawrath, Morgan 68, 69
Heatherly, Cole 82	Joslin, Michael 37	Martin, Erik 70	Nemeth, Ansley 55
Heil, Peter T. 77	Katsos, Emily A. 21, 27	Matthews, Caroline 31	Newton, Matthew Tyler 22
Hendrix, Ellis 66	Kear, Sarah 57	Mbeya, Abram 26	Nguyen, Jack 47, 48
Hernandez, Benjamin P. 45	Keen, William 67, 69	McAbee, Elizabeth 25	Nichols, Dylan 64
Hickey, Charlie 57, 61	Keenon, Hannah 73	McCallister, Shelby 46	Nix, Kitty 57, 60
Hobbs, Ryan 66	Kesterson, Amber 19	McClean, Ann 57	O'Neill, Dillon 32
Holliday, Renee 57	Kight, Jennifer 68, 69	McFadden, Mallary 35	Orton, Eric 36
Hollis, Joshua 64	Kimbrell, Renee 64	McFarland, Jessica 68	O'Shields, Ryan 64
Hopfensperger, Hannah 33	King, Rachel 67	Mclver, Andrew 46	Osiecki, Carsyn 57
Houseworth, Kristina 34	Kirkland, Jhane' 28, 73	McLaughlin, Anna-Grace 69	Owusu, Eva 21
Howe, Gedney 36	Kisker, Paige 50	McLendon, Erika 69	Pagett, Riley 66
Howell, Aaron 50	Knies, Laura 57, 58	McLeod, Taylor 39	Parenti, Krista 46
Howell, David 42	Knight, David Nate 21, 27	McMillan, Jessica Janai' 49	Patrick, Steven 83
Huffman, Sally 64, 65	Knight, Josh 54	McMullen, Nicole 81	Paulsen, Anthony 75
Hurst, Lori Lynne 66	Kress, Clara R. 43	McMurphy, Adriana 26	Paxton, Gabriel 83, 84
Hurt, Matthew J. 28	Kroft, John 48	Melendez, Theresa 12, 79	Pearson, Courtney 54
Hutchinson, Justin S. 15	Laber, Cassidy 38	Melton, Kristen 20	Peay, Shelby 17
Iacino, Melody C. 21, 27	Lacanin, Shane Ira C. 37	Metts, Catherine 19	Peña, Lesley 81
Jackson, Ashley 83	Lambert, Elizabeth 44, 81	Mickle, Jordan 68	Perry, Asia Alexis 31
Jackson, Becca 69	Lattman, Will 57	Middleton, Marion 66	Pewett, Savannah 7, 81
Jackson, Hannah 24	Lawhorn, MaLyn 18	Mikeska, Kelsey 23	Pham, Carolina T. 22
Jackson, Jai 51	Laxton, Mikaela 68, 69	Miller, Lauren Michelle 40	Plasko, Davis P. 13, 48, 79
Jackson, Jakarria C. M. 75	Lee, Gabrielle 84	Minton, Ashley 54, 68	Poppell, Julia 10, 79, 82, 85
James, Lydia W. 33	Lee, Matthew 30	Mitchum, Paige 64	Porter, Cody 23
Jensen, Ashley 69	Leggins, Autumn S. 15, 79, 81	Mize, Mary Beth 42	Potter, Hannah 68



Powell, Erin 57, 58	Sellers, Hunter G. 33, 79	Tesney, Michala 14, 40, 79, 85	Williams, Ariana 57
Powers, Paige 38	Shaffer, Carson Alicia Anne 74	Thomas, Emily 10, 38	Williams, Erin 30
Prescott, M. Bianca 28, 73	Shannon, Christine 23	Thompson, Billy 68	Williams, Kelly 57
Price, Hannah 68, 69	Shanteau-Jackson, Maryssa 24	Thompson, Carly 68, 69	Williams, Malik 52
Price, Leah 52	Sharpe, Lexy 69	Thompson, Sydney 44	Williamson, Alexis 46, 81
Quinn, Titus 67	Shaw, Maggie 67	Tillis, Misaki 37	Williamson, Jasmine 31
Railey, Maleah 57, 58	Sheets, Melody 13	Tindal, Brooke 69	Willis, Morgan 60
Rawls, Christina 64, 65	Shinn, Jamie 67	Tomberlin, Mason 69	Wilson, Kareem 67
Reilly, Jordan A. 72, 82, 83	Shuman, Brent A. 39, 85	Tomlinson, Carley 68, 69	Wilson, Larry 72
Reynolds, Ashley 66	Silva, Candace 34	Townsend, Lucas C. 44	Windey, Grace 57, 61, 63
Reynolds, Katie 34	Simmons, Shannon 30	Travis, Lauren 41	Wise, Naiesha 66
Richardson, Holly 73	Simoneau, Robert 57, 59	Trotter, Rachel 69	Wood, Emmalee 66
Rittenberry, Holly 20, 22, 81	Skelton, Carlie 34	Trull, Carmen 68	Wooldridge, Kathryn 34
Roark, Hannah 29, 34	Smith, Hallie V. 21, 27	Tsiukes, Alexander 39	Workman, Madison A. 21, 27
Roberts, Jake 45, 79	Smith, Jálen 52, 53, 81	Tuck, Jeremy 70	Workman, McKenzie E. 45
Roberts, Lauren 82, 84	Smith, Kiara 34	Turlington, La'Raine 68	Yen, Tzu-chien 64
Rollizo, Carmen A. 73	Smith, Kylie 54, 69	Turner, Julia 64, 65	Young, Amber Leeann 47
Rosario, Moryanne 29	Smith, Lauren 23	Tynes, LaShelle 52	Young, Brianna 67
Roth, Tyler 66	Smith, Megan E. 24	Vieweg, Stephanie Maree 40	Young, Leah 52
Rowell, Kristen 57	Smith, Merideth 69	Vinson, Augustine 75, 79	Zeitz, Adam C. 21, 27
Rowland, Reannah 61	Smith, Mikala R. 26, 79, 85	Waddell, Charles 57	
Russo, Anthony 66	Smith, Mychaela 54	Walsh, Cheyenne 82, 83	
Sadak, Christina 31	Snelgrove, Shannon 49, 81	Walter, Sarah M. 24	
Salazar, Claudia A. 7, 53, 81	Sommer, Jordan 61, 63	Walton, Taylor 76	
Salazar, Jade 68	Sparrow, Emily 32	Warren, Shayla 81	
Sale, Robert Anthony 42	Stahl, Leigha 9, 79, 83, 85	Washington, Camerun C. 10, 81, 85	
Sandy, Jason 57, 59	Steinke, Alli 23	Watson, Emily 11, 27, 79	
Schaeffer, Alexia 9	Stevens, Jessica 28, 50, 79	Weeks, Katie-Laken 68, 69	
Schreiber, William J. 28, 79	Stewart, Craig 57, 58	West, Elisabeth 82, 83, 84	
Schultz, Tollie J. 9, 40, 81	Stewart, Sarah 16	Westfall, Meaghan 57, 59, 61, 62	
Schuster, Alyssa 57, 58, 59	Stoddart, Jordan 74	Whiffen, Garrett 69	
Sconzo, Alyssa N. 31	Stroud, Amber Laine 49	Whitehead, Emily 51	
Scott, Aaliyah Chauntel 40	Sullivan, Jake 70	Wickens, Shayna 67	
Scott, Kelly 83	Taie, Sydney 67, 69	Wiley, Zachary S. 76	
Sears, Kasey 57	Tallent, Bridget 51	Wilkerson, Carolyn 61	
Segnini, Vivian 51	Taylor, Matthew 32	Wilkes, Preston 32	
Sellers, Cameron 27	Temple, Brianna 32	Williams, Andrew M. 19	

# FACULTY AND STAFF INDEX

Abernathy, Kristen 14, 18, 20  
Abernathy, Zachary 5, 14, 18  
Austin, Dallas 60  
Austin, Jennifer 66  
Aysa-Lastra, María 74, 75, 76, 77, 81  
Bannister, Dylan 60  
Barak, Meir 11, 35, 45, 47, 48  
Barger, Bettie Parsons 12, 14, 17, 18, 19, 20  
Bartlett, Stephanie 80  
Belk, Adolphus 80  
Bell, Gregory 5, 54, 56, 70, 71, 72, 74, 75, 77, 78  
Bickford, Leslie 8, 10, 13, 16, 17, 24, 82  
Birgbauer, Eric 14, 43  
Black Jr., Douglas 32, 66  
Bollinger, Marsha 5  
Bouchard, Marleah 18  
Boulware, Jessica 13  
Boyd, Joni 20, 22, 81  
Broñola-Dickert, Lannia 66  
Burke, Kathleen A. 71  
Burns, Elizabeth 66  
Cagle, Brent 43, 81  
Calloway, Cliff 11  
Camel, Simone 19  
Cavin, Amanda 80  
Ceaser, Tyrone 80  
Chang, Catherine 46  
Chung, Jinwook 7  
Collins, Tara 7, 9, 40, 50, 53, 54, 73, 81  
Constance-Huggins, Monique 29, 46  
Cordis, Adriana 44, 81

Cothran, Casey 16, 32  
Deguchi, Tomoko 5, 32  
Derksen, Karen 57  
Dickert, Lewis H. 66  
Dimaculangan, Dwight 10  
Disney, Jennifer L. 35, 40, 41, 42, 43, 44, 45  
Doman, Marguerite 5  
Dresbach, Chad 9  
Dubert-Bellrichard, Michelle 8  
Dufresne, Laura 21, 26, 33, 55  
Evans-Anderson, Heather 5, 41, 80, 81  
Faulkner, Seth 20, 22  
Fike, Matthew 5, 30, 38  
Fortner-Wood, Cheryl 80  
Frost, Victoria J. 9, 15, 16, 17, 21, 27  
Fuller, Sherell 17  
Gardner, Laura 49, 81  
Garland, Vivian 28  
Geer, W. Todd 66  
Gelabert, Maria 27, 28, 50, 54  
Gibson, Allison 5, 28, 73  
Gibson, Philip 10, 72  
Giles, Kari 66  
Glasscock, Laura 9, 11, 14  
Glover, Crystal 14, 17, 19  
Gordon, Daniel 16  
Grattan, Christian 5, 15, 26, 55, 70, 73  
Gray, Janet 16  
Gray, Rose 80  
Grossoehme, Nicholas 5, 12, 15, 29, 33, 75, 81  
Habib, Sabrina 9, 19, 21

Haire, Wenonah 80  
Hamed, Duha 10  
Hamilton, Mark 60  
Hamm, Arran 16, 20  
Hamm, Jessica 16  
Han, Joon 36  
Hanna Jr., James M. 11, 12, 13, 14, 15, 26, 28, 29, 45, 47, 48, 70  
Harris, Clifton 11, 19, 79  
Harris, Richard 66  
Hathaway, Dale 18  
Hayes, Matthew 49, 80  
Heard, Matthew J. 9, 16, 17, 27  
Helf, Shawwna 5, 23, 38, 42  
Helton, Mary Ann 66  
Hiner, Amanda 44  
Hoffman, Dustin 9, 10  
Hughes, Martin 66  
Hurlbert, Jason C. 12, 14, 15, 55  
Igou, Anna 5, 55  
Jenny, Seth 7  
Johnson, Christopher 70  
Jones, Gloria 1, 5, 8, 13, 17, 80, 82  
Judge, Peter 5, 18, 22, 26, 77  
Katz, Lynn 36  
Kedrowski, Karen 8  
Kiblinger, William 18  
Kohl, Kathryn 10, 19, 37, 81  
Koster, Jo 30, 48, 71  
Koszewski, Wanda 5, 18, 19  
Kull, Trent 14, 18  
Lammi, Robin K. 1, 5, 13, 15, 28, 45  
Law, Rachel 79  
Lawson, Stephanie 22, 81  
Leach, Debra 23, 42  
Lewis, Willis 80  
Lipscomb, Michael 11, 36, 44

Loomer, Deborah 66  
Lyon, Kathy 8, 11  
Mader, Cheryl 12  
Marchel, Carol 12  
McEvoy, Jeffrey 66  
McFadden, Bryan 31, 37, 39  
Ming, Kavin 20  
Moldoveanu, Tudor 40  
Morgan, Emily 5, 68  
Morris, Amy 66  
Moyer, Lisa 25  
Murdock, Diana 17  
Nelson, Donna 7, 46, 56  
O'Neill, Jill 66  
Owen, Perry 28  
Owens, Kathryn 66  
Owens, Pat 79  
Ozust, Kelly 68  
Parks, Ron 66  
Patterson, Tracy 66  
Patwardhan, Padmini 9, 19, 23, 30, 31, 32, 34, 81  
Paulino, Clara 8  
Pickett, Linda 18  
Polaski, Thomas 16, 20  
Powell, Tenisha 19  
Prickett, Robert 5  
Provencal, Sarah 16, 67  
Rademaker, Scot 7, 14  
Reiland, Sarah 8  
Richardson, Kelly 13  
Ritzer, Darren 10, 81  
Rouser, Seth 8  
Sastre, Lauren 10, 13, 18  
Schary, David 5, 23, 30, 31, 32, 34, 35, 36, 37, 39, 51, 55, 70, 73  
Schriffen, Margaret 54

Schulte, William 5, 29, 38, 55  
Shields, Carol 8  
Sinn, Jeffrey 9, 51, 52  
Sleigh, Merry 5, 7, 9, 46, 49, 50, 51,  
52, 53, 81  
Smith, Jane B. 5  
Smith III, Julian 12, 15, 35, 37, 38, 39,  
71, 79  
Smith, Marilyn 47  
Smith, Stephen 5, 11, 36  
Snyder, Kathie 79  
Solomon, Jennifer 19  
Stern, Matthew 9, 11, 14, 15, 16, 19,  
22, 23, 25, 33  
Stock, Karen 80  
Stone, Gary 17  
Stonebraker, Robert 17  
Sumner, Carolyn 60  
Sumter, Takita F. 12, 13, 14, 24, 41, 79,  
80, 81  
Tant, Cynthia 8, 12, 17, 24  
Thacker, Will 80  
Thomas, Judy 10  
Thompson, Leslie 13, 18  
Tripp, Brad 5, 53, 81  
Ullrich, Laura 5, 17  
Weeks, Evelyne 10, 16  
Werts, Scott 5, 11, 27  
Westover, Kristi M. 5, 9, 19, 21, 27, 79  
Whetstone, Kimarie 20  
Whitney, Michael 79  
Williams, Ginger 43  
Witzel, Bradley 46, 80, 81  
Wojcik, Janet 29, 47  
Wunderlich, Kristen 66  
Wynterbotham, Glyn 8  
Yeager, Barb 80



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